

**DETERMINANTS OF NUTRITIONAL PRACTICES AMONG PREGNANT
WOMEN ATTENDING ANTENATAL CLINIC AT NGAO SUB-COUNTY
HOSPITAL, TANA-RIVER COUNTY**

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE
IN NURSING OF MOUNT KENYA UNIVERSITY**

MARCH 2022

DECLARATION AND APPROVAL

Declaration by candidate:

I declare that this thesis is my original work and has not been presented for the award of any degree in any other university.

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DEDICATION

This goes to my wife, Regina Sila and our Children, Angeline, Genevieve, Moses, and Timothy for their support in my pursuit for the master's degree.

ACKNOWLEDGEMENTS

First and foremost, I take this opportunity to acknowledge the Almighty God for His protection, love and provision. Secondly, Special thanks go to my supervisors; Dr. Jane Karonjo and Dr. Nilufar Jivraj whose guidance, support and inputs made this thesis a reality. I highly appreciate your patience and motivation. Thirdly, I am also thankful to my employer, Tana River County Government for granting me the opportunity to undertake this noble Programme. In addition, my gratitude goes to my colleagues at Ngao Sub-county Hospital for their support and permission to carry on with my study. This work would also not have been realized without the support of my wife, Regina Sila and our Children, Angeline, Genevieve, Moses, and Timothy. Finally, to all those who contributed in one way or the other towards the making of this report, I will always be grateful to you.

ABSTRACT

Dietary practice among pregnant women is an observable action of behavior of dietary habit usually classified as good or bad dietary practices and usually influences both pregnancy and foetal outcome. Pregnancy presents a critical stage of development for both the mother and the developing foetus. The stage is equally nutritionally demanding with caloric intake requirements rising compared to that in pre-gravid state. Poor nutritional practices during this stage had previously shown devastating impact not only to the foetus but also to the mother. Malnutrition during this stage exposes the mother to conditions such as anaemia, diabetes among other dietary related conditions. Women in developing countries find themselves restricted by multiple factors that interfere with their capacity to meet the demands at this stage. Thus, this study sought to assess the determinants of dietary practices among expectant women visiting antenatal clinic in three dimensions that were individual factors, institutional linked factors, and socio-cultural factors. The Health Belief model was the theoretical model utilized in this study. The study design was descriptive where the variables under investigation were described. The study design was a descriptive. The sampling method was census sampling. Data was collected using self-administered questionnaires. Data analysis was done using SPSS version 24.0 whereby calculations of mean, percentages, and frequencies was done. The results indicated that majority of the respondents were aged between 21 and 25 years (32.6%), with 77.9% married and 31.4% had secondary level of education. On religion, majority were Christians (53.5%). The results showed that age of the mother, highest level of education, employment status of the mother, knowledge on balanced diet were the individual characteristics of the participants that were significant at p values $<.05$. Religious affiliation did not significantly affect nutritional practices but the cultural beliefs of the mothers were significantly associated with nutritional practices at p value $<.05$. On facility-linked factors; counselling the mothers on nutrition, using nutritional model to counsel the mothers and giving the mothers micronutrient supplements were all significant at p value $<.05$. The study indicated that an increase in education level of the pregnant mother determines their understanding of good nutritional practices; higher levels of education were associated with good nutritional practices. Therefore, health workers should endeavor to enlighten pregnant women on nutritional practices especially those with low levels of education or no formal education.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANC	Antenatal Care
BMI	Body Mass Index
DHIS	District Health Information System
HBM	Health Belief Model
IOM	Institute of Medicine
KDHS	Kenya Demographic Health Survey
KNBS	Kenya National Bureau of Statistics
MUAC	Mid-Upper Arm Circumference
NACOSTI	National Commission for Science, Technology, and Innovation
NMCP	National Malaria Control Program
PLW	Pregnant and Lactating Women
SAM	Severe Acute Malnutrition
SMART	Standard Monitoring for Relief and Transition
UNICEF	United Nations Children's Fund
WHO	World Health Organization



CHAPTER ONE

INTRODUCTION

The chapter focused on contextual of the research, problem statement, and purpose of the study, aims, study questions, justification, implication, limits, scope and demarcations. It likewise gave significance and meanings of important terminologies.

1.1 Background of the Study

Antenatal care (ANC) offers a unique period of connecting with the expectant woman while delivering the much-needed services. It promotes safety in pregnancy by providing opportunities for screening and guidance on crucial subjects such as nutrition (Phommachanh, Essink, Wright, Broerse & Mayxay, 2019). A study done by the authors involving 154 pregnant women revealed that only less than a quarter of the respondents went through nutrition counseling during their ANC visits. The healthcare system has proven beyond reasonable doubt especially where large number of clients visit the facilities that giving comprehensive services thus becomes a difficult endeavor. Antenatal care (ANC) often refers to the care offered by registered healthcare workers to expectant women with the sole aim of ensuring healthy outcome of the mother and foetus during pregnancy (Al-Ateeq & Al-Rusaiees, 2015). The services comprise of the following elements: danger notification, avoidance and management of pregnancy-linked comorbidities, health promotion, and education (AlAteeq & Al-Rusaiees, 2015). The intake of a healthy diet coupled with exercises are essential elements of ANC that assists the client in avoiding extreme weight gain that could have detrimental effects on pregnancy (World Health Organization (WHO), 2016). Considering the fact that positive results in pregnancy are dependent on the two aspects among other factors, diet becomes central to the delivery of this care. Therefore, it is important to ensure that

every expectant mother understands this on every visit. With healthy nutrition, the need for supplements declines as a healthy diet will comprise of macronutrients, essential fluids, micronutrients, and enough calories (Badon, *et al.*, 2017). The author also highlights that the first 20 weeks as the most vital in shaping the development of the infant and the total weight gained by the mother and should be assessed in relation to the pre-gravid Body Mass Index (BMI).

A study by Lama, Lamichhane, Bhandari, and Wagle (2018) supports the fact that good nutritional prospects are the prerequisites to healthy outcomes in pregnancy. With under nutrition, both the mother and the infant are in constant danger. The outcome revealed that of the 282 women studied, 24% had low MUAC (less than 23cm), 12% had anemia, while 67% did not achieve the require weight gain. In Nepal, despite the government putting healthy nutritional status as a right, there exists a huge gap that needs to be explored. However, the rationale behind the observations is less explored across different settings.

Countries such as Afghanistan have the highest recorded cases of under nutrition in the world among under five and pregnant women. With the political dynamics witnessed in the country, numerous cases of underweight and stunted growth among under five and pregnant women Shave become synonymous with the country. For instance, Lama, Lamichhane, Bhandari, and Wagle (2018), put the prevalence of the cases in the country up to 884% in Nangarhar, Farah, and Kunar districts among others. In conflict bound areas, wasting in children constituted more than 20% of the cases. This is a clear indicator that the problem is quite persistent in our modern world.

Under nutrition during the initial stages of pregnancy can be very detrimental. According to the Institute of Medicine (IOM), malnourished women i.e. those with a BMI of less than 18.5 are expected to add an average of 12.5-18 kg in the course of

their pregnancy. In addition, women with a pre-gravid BMI of 18.5–24.9 or what is considered normal pre-gravid weight should add at least 11.5–16 kg. On the other hand, mothers with a pre-gravid BMI of 25 to 29.9 are expected to add at least 7 to 11.5 kg during pregnancy. However, mothers with a pre-gravid BMI of more than 30 or what is considered obese are expected to add a minimum of 5kg to a maximum of 9kg (Savitri *et.al.* 2016). According to Ugwa (2016), the variations in the metabolic and physiologic changes justifies the nutritional demands in pregnancy.

Pregnancy demands improvement in overall caloric intake to match up the demand. According to Kuche (2014), the need for vitamins rises by 54%, proteins by 13%, and minerals by 50%. Under nutrition during this critical period by the mother corresponds to depriving the fetus of the same nutrients they require for growth (AbuSaad & Fraser, 2013). Anemia is one common problem that happens when the mother is deprived of Iron in the diet. If uncorrected, the mother is put at risk of postpartum hemorrhage which is responsible for significant mortality (Abu-Saad & Fraser, 2013). According to the authors, the different changes in pregnancy make the nutritional demands rise by 14%. Thus, any expectant woman should strive to match-up the requirements.

The existence of a growing fetus also calls for improvement in what the expectant mother takes in her diet. Every component or element needed by the fetus to grow as per the different gestational periods is derived directly from the mother. Therefore, the mother should strive to attain the demands to guarantee positive outcomes. However, several predicaments revolving around social, economic, cultural, and educational factors often act as deterrents to meeting the goals (Kavle & Landry, 2018). Nevertheless, it is important to note that dietary intake is considered crucial throughout pregnancy and post-pregnancy period to support effective lactation. According to Lassi *et al.*, (2013), the concept is essential to the development as well as growth of the

newborn. Where it is not adhered to, stunted growth result impacting of the life and survival of the infant.

Under nutrition of expectant women is a common occurrence especially in developing countries. In the Saharan Africa, WHO (2016), puts the prevalence at 35%. Another assessment of the same scenario by Lancet Nutrition Series (2013), estimates that the implications of poor nutrition at this critical stage constitute 7% of the disease burden across the globe. Moreover, the fact that poor results of the pregnancy are inevitable under such circumstances, it may serve as the rationale behind the maternal mortality occurring secondary to such situations. Another study done in Maradi region Niger in 24 villages also paint a picture of the situation in the region. Rosen et al., (2018) associated increased food prices, lack of food, and maternal complications as hindrances to consumption of healthy diet. The country has an estimated 13% of women having a low Body Mass Index (BMI) during pregnancy.

In Kenya, the integration and application of knowledge on nutrition during pregnancy remain poorly adopted. According to Echoka (2011), health promotion especially on diet is not given much attention especially due to the high number of clients witnessed in public healthcare settings. In an effort to close the disparity, a national action plan on nutrition was developed in 2011 to run up to 2017 to assist in supporting expectant women on dietary practices. However, the aim of this noble initiative has not been realized following the persistence of nutritional deficiencies among the women post the period. This study therefore will help explore on how to narrow the existing gaps that disenfranchise pregnant women on their nutritional rights to include bridging the gap between the policy makers and the key implementers, health educating the pregnant women on the implication associated with poor dietary practices, promoting health care givers/clients' therapeutic relationships among others.

1.2 Statement of the Problem

Poor nutritional practices and related maternal and child complications continue to persist despite numerous interventions by various agencies. . Due to poor maternal nutritional practices, globally, an estimated 15 million babies are born prematurely and about 20 million are born with low birth weight with more than 95 % occurring in resource-poor countries according to WHO (2015). According to data from UNICEF (2015), developing countries are the most hit by the problem with over 200 million expectant mothers presenting with issues around this menace annually. The implications are often far-reaching affecting both the mother and the baby. Kuche (2014), highlights that under nutrition in pregnancy is a serious public health issue responsible for multiple maternal and child morbidities and mortalities notably in developing countries. A similar observation is made by WHO (2018) indicating that globally, 585,000 mothers die annually secondary to pregnancy and associated complications. A worrying 1,500 mortality cases happen daily in such countries.

Malnutrition is often considered in reference to a BMI of less than 18.5. According to WHO (2017), the phenomena exists in about 20% of mothers or women in reproductive age bracket in Africa. Consequently, the expected weight added during pregnancy declines significantly. On a different concept, over nutrition as marked by obesity and overweight has gone up since the year 1980 also contributed to significant complications, morbidities, as well as mortalities. According to the Lancet Global Health (LGH) (2013), anemia prevalence surpasses 500,000 cases across the globe. The organization also noted that in 38% of expectant mothers especially those between 15 to 49 years had confirmed cases of anemia. Women and children are more at risk of being anemic in Kenya. The rate of anemia is 42% and 36% for women and under five

children respectively (KNBS, 2015; National Malaria Control Programme (NMCP), 2016). The data puts anemia as responsible for 23% of cumulative maternal mortalities. A comorbid Calcium level deficiency also predisposes expectant women to preeclampsia, which causes a significant 19% mortality.

Short women are at an increasingly high risk of getting into obstructed labor which is associated with fatal /neonatal and maternal outcomes. Growth restriction for the fetus is also a common phenomenon especially where there is low BMI with maternal stunting. According to Mitanchez, Burguet, and Simeoni (2014), the overweight and obese women are also exposed to pre-eclampsia and gestational diabetes which often leads to negative maternal and fetal outcomes.

Tana River County is no exception when it comes to maternal under nutrition. A survey done by the county standardized monitoring for assessment, relief, and transition (SMART) indicate that 7.4% of mothers in child-bearing age were under nourished. In addition, statistics from the same department revealed that similar scenario was observed among pregnant and lactating women (PLW) at 5.3%. The county also reflected acute malnutrition among children below 5 years at 17.6%, while Severe Acute Malnutrition (SAM) was at 2.8% (Hussein, 2014).

Ngao Sub-county Hospital mainly attends to population from the Tana Delta Sub County. According to the ANC register at the facility, 400 expectant women were attended to in the first quarter of the year 2019. However, 53 mothers presented with different signs of malnutrition as indicated by the DHIS register. The data points out to a 16% prevalence of malnutrition among the expectant women (Hussein, 2014).

1.3 Purpose of the Study

To assess the determinants of nutritional practices among pregnant women attending

ANC at Ngao Sub-County Hospital, Tana River County.

1.4 Specific Objectives

- 1) To determine individual characteristics influencing dietary practices among expectant mothers visiting ANC at Ngao Sub-County Hospital, Tana River County.
- 2) To determine the socio-cultural factors influencing the dietary practices in women during pregnancy among expectant women visiting ANC at Ngao Sub-County Hospital, Tana River County
- 3) To determine the facility-linked factors influencing dietary practices among expectant women during pregnancy in ANC at Ngao Sub-County Hospital, Tana River County

1.5 Research Questions

- 1) What individual characteristics influence dietary practices among expectant mothers visiting ANC at Ngao Sub-County Hospital, Tana River County?
- 2) What socio-cultural factors influence the dietary practices of pregnant women visiting ANC at Ngao Sub-County Hospital, Tana River County?
- 3) What facility-linked factors influence dietary practices among pregnant women visiting ANC at Ngao Sub-County Hospital, Tana River County?

1.6 Hypothesis

Null hypothesis: There is no statistical association between individual factors affecting dietary practices and nutritional behaviors among mothers visiting ANC at Ngao Sub-County Hospital Tana River County.

Alternate hypothesis: There is no statistical connection between facility-associated factors and nutritional behaviors among mothers visiting ANC at Ngao Sub-County

Hospital, Tana River County.

1.7 Justification of the Study

Pregnancy is a critical period of development characterized by rapid cell differentiation and growth for the fetus and the mother. Therefore, any alterations in diet is likely to impact heavily on the development of the fetus. According to Maqbool, *et al.*, (2019), intrauterine period of development presents the most delicate times especially where maternal nutritional stores are depleted. Without optimal nutritional status, the mother is predisposed to adverse outcomes in pregnancy to include infections, intrauterine growth retardation, as well as premature labor and birth. The lack of elements such as iron, calcium, zinc, adequate proteins, vitamins, carbohydrates, minerals, and fats spell negative outcomes in pregnancy and to the child. Therefore, the prospects of nutrition in pregnancy has far-reaching consequences and should not be underestimated.

Anemia is one of the significant implications of under nutrition among numerous expectant women. In 2014, the cases were at 22% while upper extremes in weight were at 9% globally. The coverage of iron for expectant mothers for at least three months is 8%. The glaring existence of the issue means that collaborative efforts ought to be initiated at all levels to counter the problem and avoid escalating it to the fetuses and the newborns.

1.8 significance of the study

The outcomes of the study will serve a great purpose to women especially the expectant ones as it will help identify gaps in nutritional practices and recommend possible solutions to bring remedy to the issue. Health professionals may equally utilize the findings of this study to shape their health education strategies regarding nutrition

among expectant mothers. The regulatory body, which is the ministry of health both at national and county levels, can also utilize the outcomes in identifying policies that could benefit the vulnerable groups living in such areas as Tana Delta. It will also help those who may wish to undertake research on the key areas that will be captured in the study as well as contributing to the literature. Moreover, this scholarly piece will enhance future studies and create a platform for reasoning on issues surrounding dietary practices among expectant women.

1.9 Study Limitations

The study had geographical limitations in that it was narrowed to Ngao Sub-County Hospital in Tana River County. Contextually, the study only dealt with nutritional practices among the pregnant women visiting the MCH clinic in the facility.

Moreover, the study did not explore the caregivers' knowledge on the subject matter although their attributes and knowledge may impact on the nutritional practices by their clients. The study only covered the pregnant mother since she was the one directly involved in making choices for her diet throughout pregnancy. Moreover caregivers may recommend dietary choices in which they do not provide at the healthcare settings or even oversee their implementation.

1.10 Delimitations of the Study

The study put into use census sampling method to obtain feedback from the target population. The outcomes were generalizable across such a population group in different settings of similar socio-economic status. This is because women visiting the Ngao Sub-county hospital were widely distributed across different socio-economic groups. Thus, the method minimized errors where data was skewed towards one

outcome favored by some sampling techniques. On the other hand, the scope of this study was broadened by also looking into other contributing factors such as those associated with the facility under study.



1.11 Operational Definition of Key Terms

Descriptive Statistics: This is a concept used in research to assist in summarizing and describing data

Good nutrition: Taking balanced diet regularly

Nutrition:

This is the process of providing energy requirements or nourishment achieved through consuming food with the required number of elements necessary for growth or development

Pregnancy:

It is termed as a state which occurs following implantation whereby a woman carries a developing embryo or fetus

Practices:

These are processes, methods or even procedures applied in a given concept.

Pregnant Woman:

This is a female who carries a developing embryo or fetus

Questionnaire:

This an instrument used in research containing a set of questions aimed at obtaining information from a respondent.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter dwells on exploring the available literature based on study objectives of nutritional practices among pregnant women. It sheds light on the studies done in different parts of the world and the region on the subject. The focus is on three main areas which include; individual characteristics, socio-cultural factors, as well as facility-associated factors impacting on nutritional practices of this group. Exploration of these

components will help provide a foundation to answering the research questions posed in this study as well as insights on possible areas of exploration.

Furthermore, current studies will be vital to the analysis.

2.1 Empirical Literature

2.1.1 Individual Characteristics Influencing Nutritional Practices among Pregnant Women

Age is one of the key considerations in dietary intake among pregnant women. According to Teixeira, *et al.*, (2018), older women adhere more to the dietary requirements as opposed to the young pregnant women in Brazil. The practices were also highly linked with higher level of formal education. The authors indicate that the common diet for the older group comprised of whole grains, seasoned vegetables, and soups. On the other hand, the young preferred sweets, sandwiches, soft drinks, and snacks. Compliance to such diet was highly associated with numerous cases underweight while in other cases there was normal weight among the women. The lack of formal education also perpetuated the practices of poor dietary choices (Teixeira, *et al.*, 2018). This implies that the older a woman of reproductive age is, the more likely she is to make informed dietary choices.

Nutrition in pregnancy is also affected by financial status. According to Griffith *et al.*, (2013), higher incomes often mean that the percentage spent on food will be quite small as opposed to those with smaller income. Thus, in areas of economic hardships or people in poor economic state, expenditure on food is minimal which justifies under nutrition under such circumstances. A similar observation was made during the economic recession period witnesses in Britain. According to Griffith *et al.*, (2013), between 2005 and 2007, the income spent on food and food supplies went down by

8.5% in comparison to a similar period between the years 2010 and 2012. However, an assessment of energy consumption levels indicated that the values dropped by 3.6% which meant that families preferred alternative means of obtaining energy sources through energy denser foods.

Young maternal age is often associated with complications and dietary supplementation. According to Johnson and Moore (2015), adolescence presents a major challenge of poor integration of dietary requirements. The incorporation of supplements such as zinc, folic, and iron supplements improved the outcomes of the pregnancy. The most affected ages are those between 13.5-19.6 years. The competing interests of the rapid development occurring at this age is likely to present the competing interests. The impact is devastating to both the young mother and the offspring especially where it is difficult to meet the demands. The WHO usually recommends the avoidance of pregnancy in adolescence to prevent poor pregnancy outcomes (Johnson & Moore, 2015). However, health interventions reaching out the huge numbers of those in this category is very limited. A study by Eshriqui et al., (2016) conducted in Brazil also offers a perspective of nutrition in pregnancy as defined by different ages. The authors point out that older women had a strong affiliation to the traditional diet compare to the young. Nonetheless, the consumption of processed or modern food was high among the two groups. According to Mathews *et al.*, (2010), older women are expected to have cumulatively acquired knowledge on childbearing and dietary practices as opposed to the young mothers.

Another study done in Brazil involving 353 participants with an approval rate of 95% also found out that the dietary considerations of the older pregnant women differed with that of the young (Gomes, *et al.*, 2019). 59.5% of the study group comprised of the young in which 42.2% were primigravidas. The outcome revealed that the common

choices were whole grains, fruits, beef, and dairy products. On the other hand, the young were found to have poor adherers to the diet as well as those living away from the partner. The outcome points out that age can be an important factor to consider in nutrition during pregnancy.

In India, nutrition in pregnancy is embraced as a fundamental component in antenatal visits in India. According to Ajantha, Singh, Malhotra, Mohan and Joshi, (2015), an overwhelming 87% of the respondents were taking iron and folic acid supplements give during their regular visits to antenatal clinics. Interestingly, 32% had no idea what a balanced diet is. This implies that there is an obvious gap in knowledge among pregnant women that needs to be addressed. The results conquer with the findings of another study by Lee, Belski, Radcliffe, and Newton, (2016) where only 2% of the 114 respondents recorded an 80% score on nutritional knowledge.

Education is a critical component whose weight cannot be overlooked in pregnancy and nutrition. According to Oh, Kang, Cho, Ju and Faye, (2019), mothers with above primary education demonstrated significant healthy nutritional practices. The study involved 171 participants in Senegal with a 27.1% variance. With education, had better attitude, income, and knowledge that characterized their patterns in better decision making. The study also established a clear link between the impact of the programs provided in the health centers and the choices made by women on diet. Thus, education background is paramount to supporting nutritional choices in pregnant women as the two are closely linked. A study done in China incorporating 3,036 respondents assessed the health outcomes of those who adopted vegetable-rich dietary patterns. According to the observation by He *et al.*, (2015), the practices lead to good fetal and maternal prospects. Thus, education is a core determinant in BMI and dietary intake among expectant women.

Another study by Amegah, Nsoh, Ashley-Amegah and Anaman-Togbor, (2018) done in Cape Coast, Ghana supports the concept of socio-demographic factors affecting dietary choices in pregnancy. According to the study outcomes, elements such as education, marital status, ethnicity, and occupation impacted on the intake of vitamin D supplements. At 95% confidence interval, the outcome indicated that there was a constant decline in consumption of vitamin D across the three trimesters. The first with an average of 10.51 micrograms, second with up to 1.42 micrograms, while the third had an estimated 5.17 micrograms (Amegah, Nsoh, Ashley-Amegah, & Anaman-Togbor, 2018). Thus, literacy is a key factor to be considered among such women.

Gender is also significant factor in dietary considerations in pregnancy. A study by Arganini *et al.*, (2012), postulates that the social role taken by women influences the choices made on diet. Based on the fact that women assume a lower social status as opposed to their male counterparts, their decision on food is dictated by their financiers who are mostly men. The society preserves the right to make decisions for the family which in most cases include what is consumed by the family. This disadvantages the expectant mother who is supposed to purchase and consume what she is taught from her visits to the ANC. Griffith *et al.*, (2013) also highlights that some African cultures bars their women from consuming eggs claiming that the infants may be born without hair.

Nutrition in pregnancy is also influenced by individual preferences. According to Chun *et al.*, (2011), the choices made have far-reaching implications not only to the mother but also the fetus. In this case, the major considerations revolve around either dislikes or preferences of the individual. In addition, cultural, religious, biological, and even social prospects may contribute to the decisions made. Thus, it is crucial to clearly

understand what may lead to the variations in the behaviors in different settings to stand a better chance of giving the right health education to the expectant women.

In Kenya, a study by Abdirahman, Chege, and Kobia, (2019), done in Mandera County affirms that maternal age is a key component to be considered in nutrition. According to the authors, adolescence predisposes the young mother and the fetus to high risk of morbidity and mortality. The outcome also goes further to impact on the growth of the child after birth since lack of experience or knowledge may mean poor dietary choices among the women. The outcome also reveals that numerous participants (68.4%) had primary education and below and most were not married. Their knowledge on nutritional practices also proved to be low with about 47.5% having average knowledge on dietary intake. Therefore, poor knowledge on diet often led to poor choices on diet. Determinants of food practices may involve the type of diet taken as well as the factors determining why certain foods are consumed. The type of foods eaten is influenced by factors related to both non-food and food. Examples of the latter are food likes and dislikes biological, demographic, economical, sociocultural and psychophysiological factors. (Chun *et al.*, 2011).

2.1.2 Socio-cultural Factors influencing nutritional intake in pregnancy

Sociologically, pregnancy is a crucial period characterized by immense pressures especially from the social sphere. According to Hirschauer (2014), the norms enshrined by different societies make the expectant woman bear the burden of adhering to the prescribed behaviors for her wellbeing and that of her fetus. According to Graham and Oakley (2015), expectant women often find themselves tied by the pressure to adhere to different elements within their environment. However, HCW attending to the woman such as doctors also tend to treat her in isolation medically rather than holistically.

Socio-cultural factors play a vital role in determining nutritional practices during pregnancy. Religious practices and cultural beliefs are the most crucial elements to consider. Every person thrives in an environment characterized by an aspect of either culture or religion. The way of life dictated by a given society is what shapes what individuals should conduct themselves during pregnancy and childbirth. Nutrition is central to the lifestyle conduct in many societies across the globe. According to Mazur, Marquis and Jensen (2013), culture is often used in reference to the conduct of life exhibited by a social grouping. The behaviors, values, or even beliefs often transit from one generation to another. Therefore, expectant women conform to a given culture which may shape the results of a pregnancy.

A study by Chai, Gan, Chin, Ching, and Appukutty (2019) explored the behavior of 177 female vegetarians in Malaysia arising from Hindu and Buddhist religions. The outcome revealed that 28.2% of the respondents had anemia. According to the authors, women below the age of 50 years ought to constantly enrich their diet with iron and protein sources which are critical at this stage. The loss of blood that accompanies menstruation should be a constant reminder that their diet require to have rich dietary sources of the supplements. On the other hand, the hemoglobin levels fall with pregnancy and thus require additional sources of the nutrients. For Buddhists and Hindus, the dietary limitations expose the women to numerous cases of anemia especially with pregnancy. According to Patil *et al.*, (2014), pregnancy often brings restrictions of dietary consumption among women in most settings. For instance, a study done in India by Patil *et al.*, (2014), found that 63.7% of the respondents avoided one or more vegetables or fruits when expectant.

Another study on vegetarians and vegans by Winter (2019) revealed that the population could be at risk of deficiency in micronutrient intake. The micronutrients include iron,

calcium, zinc, vitamin B12, as well as vitamin D. An analysis of 22 people also revealed that the infants presented with cases of hypospadias, and low birth weight. The author urges that pregnant women should not just choose diet based on the religious or cultural beliefs but on their present nutritional requirements. By so doing many complications in pregnancy can be avoided.

In most African communities, the state of pregnancy calls for alterations in the social roles. Graham and Oakley (2015) pregnancy often leads to a wide range of changes in tasks done by the woman as well as her position in the society. The birth of an infant automatically makes one a mother which implies that her social groupings also experiences the change. Another observation by Sutherland (2017) suggests that the drastic changes experienced by women also shapes their conduct especially in

Western societies.

Taboos can also be influential deterrents to the adherence of nutritional requirements in pregnancy. A study conducted in Ethiopia by Mohammed, Taye, Larijani, and Esmailzadeh, (2019) involving 592 pregnant women revealed that 18.2% of the respondents did not take one or more type of food. The practices were upheld by 26.2% of the anemic while about 14.6% of those who observed them were not anemic. The authors also reveal that among the foods avoided were organ meat, spinach, broccoli, kales, and green chili pepper. Thus, pregnancy-related food taboos (PRFT) in such communities may lead to poor adherence to dietary needs during pregnancy especially where valuable food such as those mentioned above are avoided.

Another study done in the same country by Molla, Guadu, Muhammad, and Hunegnaw (2019) put anemia cases at 29% as per 2016 data. The evidence may be supported by the existence of such taboos prohibiting pregnant women from taking certain foods.

Another study by Chakrabarti and Chakrabarti (2019) done in West Bengal also concluded that taboos were important deterrents to achieving optimal nutritional intake

in pregnancy. The respondents included 44 women sampled across the Muslim and Hindu religions in which the former were 68.2% while the latter were 31.8%. However, women in this case acknowledged the fact that they were not the primary decision makers regarding their nutrition. Majority of the decisions are made by the husbands (45.5%), and the in-laws at 54.5%. In this case, women cited the main reasons for avoiding some foods as the possibility of getting into difficult labor, miscarriage, and possible abnormalities in pregnancy. For instance, coconut is avoided during pregnancy in this part of the world owing to the fear that it can cause obstructed labor. A similar observation was made by Abdullah and Hammo (2019) in developing countries whereby women in rural areas are likely to uphold more taboos than those in urban areas.

Superstitions can also be a key cultural determinant in adherence to dietary requirements during pregnancy. According to Sultana, Chowdhury and Shapla (2019), 69.8% of the respondents who were pregnant women visiting Combined Military Hospital in Bangladesh demonstrated at least a form of superstition. The beliefs were more prominent (85%) among participants aged 25 to 40 years. Interestingly, 81.13% of those identified to have superstitions were illiterate, 65.21% was also recorded among those with primary level education, 50% among those at secondary level, while tertiary level had 33.33%. Another finding was the fact that low socio-economic status had the highest cases of superstition at 92.72%, the middle class at 75.59%. In addition, religions also contribute to the superstitions with Hindus at 97%, Muslims at 59%, and other religious groupings also at 67.16% (Sultana, Chowdhury & Shapla, 2019). Thus, culture and religious practices play a vital role in the establishment of superstitious beliefs that impact on nutritional practices during pregnancy.

In Iran, a study involving 411 participants with a p value of <0.05 conducted in 2015 also established a statistical significance between spiritual beliefs and physical activity during pregnancy (Rabiepoor, Sadeghi & Sayyadi, 2017). According to the outcome, women who demonstrated higher spiritual health also had minimal physical activity. This implies that religion can play a significant role in shaping the nutritional decisions in pregnancy.

Religion is another deterrent to optimal nutritional intake in pregnancy. Different religious beliefs present a complex challenge to healthcare providers. According to Swihart and Martin (2019), majority of patients rely on their cultural and religious beliefs even when making decisions regarding their health. However, many healthcare givers fail to take this into account when delivering different services. In developing countries, religious beliefs are one of the reasons behind poor pregnancy outcomes. According to Mckerricher and Petrucka (2019), the countries in question lack well-established policies and programs on maternal nutrition. An analysis of results involving 510 participants where $n=308$ in Bangladesh also evaluated dietary practices among expectant women. The outcome highlighted traditional customs and beliefs as one of the key barriers to the intake of nutritional supplements. For instance, the belief that taking laxatives would reduce their weight and facilitate easier birth was common among the women (Mckerricher & Petrucka, 2019). In addition, they believed that everything (including health and nutrition) is in God's hands meaning that it's not their responsibility to observe their nutritional practices.

Hardship areas and low-income settings often complicate dietary options in pregnancy. According to Cummings and Macintyre (2016), obesity and poor dietary choices are notable observations especially in low-income states. In developed settings, grocery stores and supermarkets are the preferred areas access points for food supplies. On the

other hand, poor states have limited choices on food as they are clearly deprived of food as noted by Darmon and Drewnowski in their study in 2018. In the two cases, culture is also at the center of the choices made. For instance, fasting periods advocated by Muslims and Christians may often deprive the expectant woman of nutrients considered vital to the development and growth of the fetus. Moreover, where the woman is prohibited from consuming some types of foods, the situation may be even worse where the options are limited.

Some norms may also be detrimental to the mother and the fetus. For instance, societies considering men as superior beings even on matters of food and diet may deprive the women of key dietary prospects that may lead to negative outcomes in pregnancy. Where a man is supposed to take his meals before the woman and children in the house, this may often lead to poor consumption of food that may be detrimental to the pregnancy (Hailelassie *et al.*, 2013). Given the fact in low-income states the food sources may be limited, upholding such norms spells doom for the expectant mother. In other cases, men are also given the best and the largest share of every meal prepared in their homes which may leave little for the woman and other children to partake.

Upholding some cultures may also be detrimental to the outcomes in pregnancy. For instance, those that believe that the intake of eggs can result in infants born without hair can interfere with protein intake especially where this may be the only source of protein available (Schumer *et al.*, 2014). On the other hand Rao *et al.*, (2013) indicates that comprehension of what can be termed as healthy often shapes health promotion revolving around food.

2.1.3 Facility-Linked factors influencing dietary practices by women during pregnancy

Healthcare settings provide a platform for the interaction between the client and healthcare providers. During this period, nurses and other healthcare workers (HCWs) share knowledge and advice to clients based on their needs. Antenatal clinic is one such area where pregnant women ought to have a comprehensive interaction between them and nurses. However, various factors within the facility may prevent comprehensive interaction. According to Singh, Shrivastava, Singh and Acharya (2019), ineffective budgeting, poor planning, poor infrastructure, delay in releasing funds, as well as understaffing are the leading causes of poor service delivery in ANC.

With this in mind, guiding women on nutrition in pregnancy becomes an increasingly difficult challenge to accomplish.

In some developing countries, poorly funded facilities lack micronutrient supplementation for pregnant women. The challenges presented by different risk behaviors as well as the prevailing circumstances make it even more difficult to meet the nutritional demands in pregnancy. Also, the burden has far-reaching implications to the newborns who present with underweight and other nutritional deficiencies (Kimani-Murage, et al., 2019). Thus, considering the fact that it is difficult for the women to meet the demands in such ecological settings, it is vital that each healthcare setting have micronutrients supplements to prevent nutritional deficits complications in pregnancy. In addition, the services provided should be friendly to promote more visits which will help in identification and treatment of nutritional deficits which may arise (Kimani-Murage, *et al.*, 2019).

The lack of or poor infrastructure also poses a serious threat to maternal nutrition in pregnancy. According to Darson (2019), the concept of promoting maternal and child

health is a fundamental issue of public health concern. For instance, developing countries have lack the services available in developed countries. In addition, poor road network makes the health facilities inaccessible especially in extreme weather conditions. Therefore, the barriers mentioned in this case may make expectant women fail to benefit from the services rendered in the hospitals.

In India, a study by Mukherjee, Sen and Shah (2019) cites poor maternal nutrition during pregnancy as the risk factor to malnutrition among children. It also contributes to maternal mortality which stands at 130 per 100,000 live births in the country (Mukherjee, Sen, & Shah, 2019). In this case, the study involved 182 expectant women whereby 19.7% of the respondents were obese while 30.3% were underweight. The authors advocate for the identification and follow up of the women along with nutritional counseling to help seal the gap in nutritional deficits. Nutritional services can also be a critical determinant of nutritional status in pregnancy. A study done in Kenya by Nyamasege, *et al.*, (2018) identified knowledge deficits among pregnant women as one of the elements leading to underweight babies. However, with nutritional counseling, the results would significantly improve especially for those who hail from low socio-economic backgrounds. In this case, at 95% confidence interval, a total of 1001 respondents were analyzed. The outcome revealed about 6.7% cases of low birth weight as opposed to 2.5% among those who received nutritional counseling. Another study by Sunuwar, *et al.*, (2019) involving 115 participants found out that the consumption of iron-rich foods following nutritional counseling led to significant improvement in hemoglobin levels by 8.26 ± 4.57 among the intervention group as opposed to 1.05 ± 6.59 among the control group.

2.2 Theoretical Framework

This study is founded on the Health Belief Model (HBM) as outlined by Rosentock in 1974. The theory operates on three postulates grounded on the belief that for any person to take an action to avoid disease he/she must first consider themselves susceptible, the disease has negative implications in their life, and considering a particular initiative may prove vital by lowering the susceptibility in the event of the disease occurrence.

On susceptibility, the theory indicates that the concept differs based on a condition. The worst scenario is seen where an individual denies being vulnerable to a given condition. Although the perception of the risk is purely subjective, people often show differing views on the risks that face them despite having facing similar circumstances. The conviction also differ on the seriousness posed by the risk. The consequences attributed to a given condition such as its impact on the family life, job, and social relationships may dictate the seriousness given to the medical condition or risk (Rosenstock, 1974). For instance, if one believes that pregnancy is not medically serious, then, should a condition such as eclampsia happen, this will cause untold economical or even psychological suffering that will make them believe the seriousness.

On the other hand, the action taken depends on the belief attached to being susceptible to a disease. Exploring the available alternatives focused on lowering the danger also depends on the attributed benefits. Where individuals are ready to take actions to avert the perceived risk, it becomes highly successful in lowering the risk or danger. In other words, HBM operates on the principle that individual perceptions may influence the modifying or intervening factors taken to avert a risk (Rosenstock, 1974). Consequently, the possibility of taking an action is dependent on the merit attributed to the modifying factor.

The theory is valuable to this study as it tends to allude that the perceptions of pregnant women on the risks posed by failure to comply with proper nutrition may influence the actions they take towards eliminating the risk. Pregnancy poses the risks of conditions such as anemia, intrauterine growth retardation among others that have devastating impact on the mother and the fetus such as premature labor low birth weight respectively. Although clinicians (doctors, nurses, nutritionists, clinical officers) may be involved directly in counseling mothers on nutrition aspects based on their needs, the primary role of implementing the dietary considerations lies with the patient. Those who embrace the fact that pregnancy is a risk to their health and that of the newborn observe nutritional requirements while those who take it lightly end up developing the complications associated with the pregnancy and nutrition. Therefore, HBM provides a platform for articulating concepts that influence nutrition among expectant mothers and the associated link between the model, culture and behaviors essential to assist in determining the likelihood of a mother choosing whether to adhere to the recommended nutrition guideline during pregnancy.

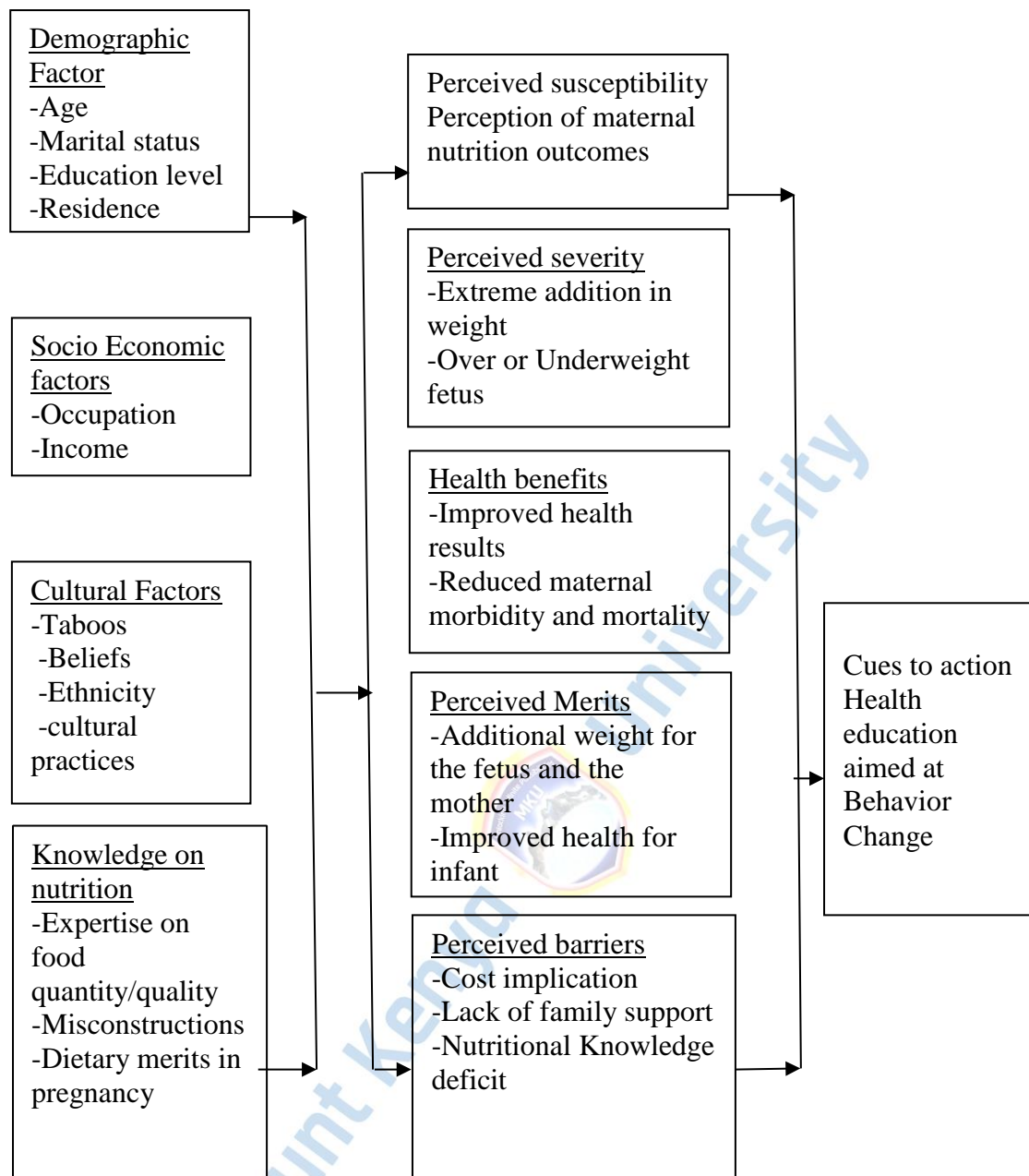


Figure 1: Theoretical frame work

2.3 Conceptual Framework

Conceptual framework presents the association between the research variables and often provides this association in a diagram. This makes it easy for the research and other readers of the research to understand and see this existing relationship (Orodho, 2018).

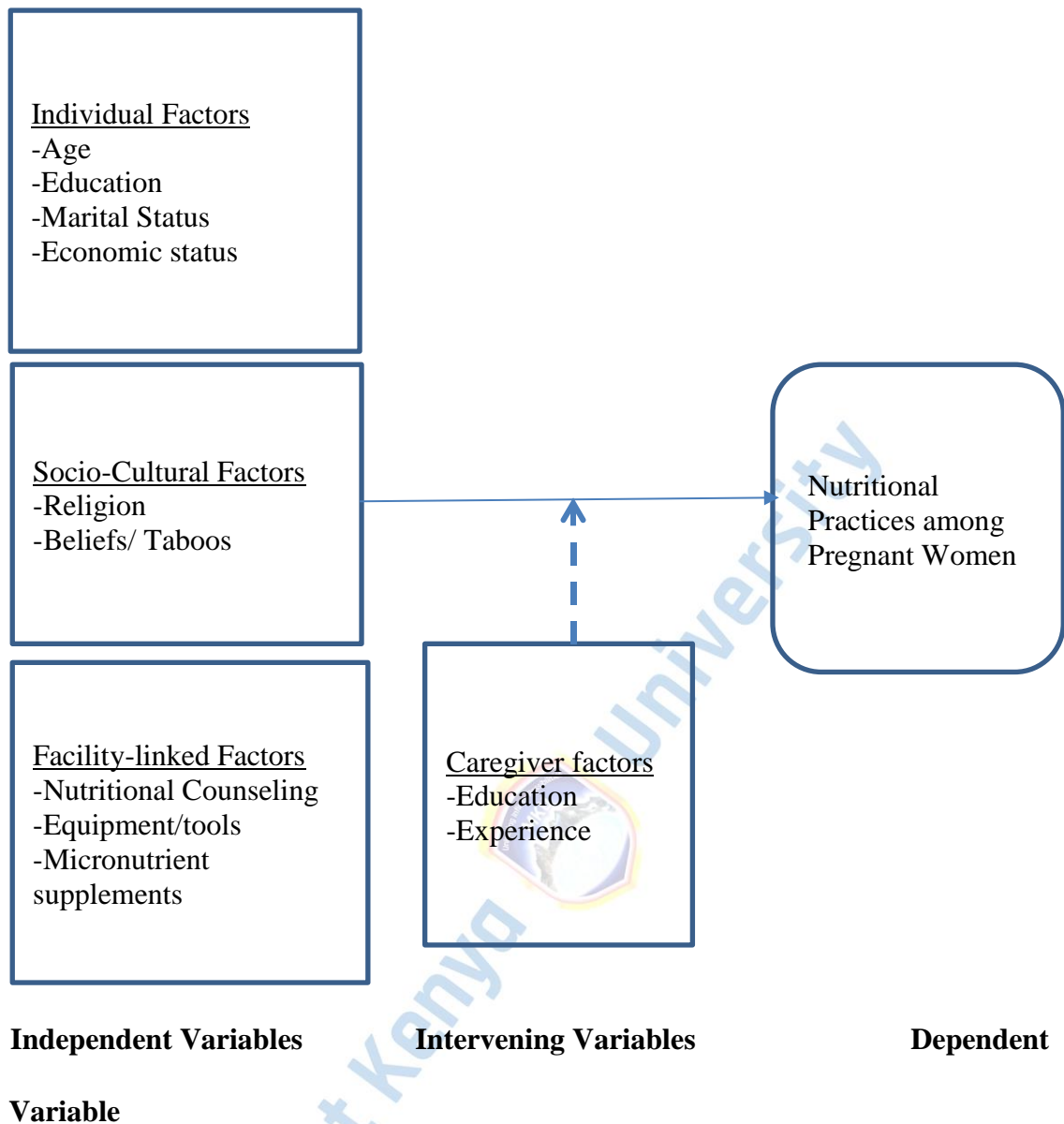


Figure 2: Conceptual framework

The study focuses on evaluating dietary concepts among expectant women visiting ANC clinic at Ngao Sub-County Hospital. Thus, the independent variables were the individual factors, facility-associated factors, and socio-cultural factors. On the other hand, the intervening variables were the healthcare giver factors such as experience and education. The nutritional practices of expectant women visiting the clinic will form the dependent variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The current chapter consists of the introduction, research methodology, research design and the location of the study. Information on target population and sampling procedure is also stated, additionally, research instruments, piloting, data collection methods and data analysis are included.

3.1 Study Design

Research design is often used in reference to the techniques and methods applicable by an investigator or researcher when putting together the different components in a research in a logical manner to assist in analyzing the issue under consideration (Akhtar, 2016). The study utilized cross-sectional study design that was descriptive in nature and was fundamental in analyzing the nutritional practices ranging from individual factors, institutional factors, to socio-cultural factors affecting pregnant women in Ngao Sub-county hospital in Tana River County. According to Mugenda and Mugenda (2003), the design was appropriate in assisting to describe the study subjects at one point in time without interfering with their traits. It is vital in providing valuable details for the issue under analysis.

3.2 Study Area

The counties of Kitui to the county's west, Mwingi to the county's northwest, Garissa to the county's northeast, Ijara to the county's east, Meru North and Isiolo to the county's north, Lamu to the county's southeast, and Malindi to the county's southwest all border

the Tana River County. Along its 35-kilometer stretch of coastline, the county is bordered by the Indian Ocean.

The research was conducted at the Sub-county health facility in Ngao area of Tana Delta, situated in Ngao location and Sub-location, Tarasaa Division, which is in the larger Garsen Constituency in Tana River County. The hospital offers a wide range of services covering curative, rehabilitative, health promotion, and illness preventive services. The major causes of morbidity and mortality in the Sub- County are malnutrition, malaria, HIV/AIDS, Tuberculosis, Diabetes, Hypertension, and other non-communicable diseases. The Antenatal care Clinic (ANC) for expectant women is open from Monday to Friday but closed on public days and weekends.

3.3 Target Population

The research primarily focused on expectant mothers visiting ANC at Ngao Subcounty Hospital. The group was responsible for implementing health-eating habits in their homes with or without nutritional counseling during pregnancy.

3.4 Study Population

The population on focus here was expectant mothers visiting ANC at Ngao SubCounty Hospital. The ANC department receives about 100 antenatal clients every month.

3.5 Selection Criteria

The study respondents were obtained utilizing the following criteria.

3.5.1 Inclusion Criteria

The study took into consideration all expectant mothers aged eighteen years and above attending ANC at Ngao Sub- County Hospital. In addition, only those who gave consent were included in the study and the analysis.

3.5.2 Exclusion Criteria

Partners to the pregnant women were not taken into consideration as not all accompany their spouses to the hospital.

3.6 Variables

3.6.1 Independent Variables

i. Individual Factors

Individual factors variables of interest included; age, education, marital status, and economic status.

ii. Socio-Cultural Factors

The main components for investigation incorporated religious practices, taboos, and beliefs.

iii. Facility-linked Factors

In this case, the key areas of investigation revolved around the availability of nutritional counseling services, equipment/tools and supplements.

3.6.2 Dependent Variable

The dependent variable involved nutritional practices among pregnant women. It took into consideration measures taken to meet the nutritional requirements of this stage of development.

3.7 Sample Size

The hospital receives an average of 100 antenatal mothers every month. A representative population was obtained from the group for analysis. According to Yamane's Formula as put by Mugenda and Mugenda (2003), the sample size was

realized following the criteria below.

$$n = \frac{N}{(1 + N(e_2))}$$

where n= Sample size

N= Population size e= Level of precision or

Sampling error which is $\pm 5\%$

Therefore;

$$n = \frac{100}{(1 + 100(0.05^2))}$$

n= 80

To cater for attrition, additional 10 % non-respondent (8) mothers were included.

Thus, the representative sample was therefore 88 pregnant women.

3.8 Sampling Procedure

The study utilized census sampling. Considering the fact that the sample size is 88 mothers, there is need to maximize every opportunity to achieve the sample population. The technique deemed useful where the sample size is either 200 or less (Mugenda & Mugenda, 2003). Thus, with the use of this method, a good scale of precision was achieved.

3.9 Data Collection Tools and Methods

The study applied self-administered questionnaires being guided by the research objectives with the help of my supervisors. Since the coverage area is cosmopolitan, research assistants were used to interpret the questions to the mothers in their local dialect where need be. Data regarding the variables under investigation was obtained via questions targeted to obtain the same from pregnant women who were attending the

ANC. Specifically; the questionnaires was split into sections to help obtain data on individual characteristics influencing dietary practices among expectant mothers visiting ANC at Ngao Sub-County Hospital, Tana River County, socio-cultural factors influencing dietary practices among expectant mothers visiting ANC at Ngao SubCounty Hospital, Tana River County, and facility associated factors influencing dietary practices among expectant mothers visiting ANC at Ngao open-ended questions, which helped obtain comprehensive data. Data was collected in a private area that was different from the ANC room. The average time utilized in accomplishing this task was an average of about 10-15 minutes. Nutritional practice was measured using a Likert scale with options of regularly, sometimes, rarely and never. Those who had good nutritional practice always were marked as regular, those who indicated sometimes meant they practiced good nutrition but not always. After obtaining the data, a single variable was computed from the four responses and then categorized as good practice and poor practice.

3.10 Validity and Reliability

3.10.1 Validity

Validity is a critical component in research that authenticates the accuracy of data obtained. According to Heale and Twycross (2015), the concept can be assessed in either construct or content validity. In the former, it refers to the ability to draw inferences especially on the test scores. The latter refers to evaluation of the tool in relation to its capacity to cover the elements or variables under investigation. Validity of the research was determined using semi structured questionnaires that had been customized from other previous studies and guidelines so as to yield consistent results. The researcher involved skills and expertise from experts and lecturers to view the tools

and give useful feedback to ensure validity. In other words, the researcher engaged skills of experts and lecturers to look at the instruments and give feedback to ensure validity. The sort of data collected by data collection tools must be such that it may be used to answer the questions posed by the researcher.

3.10.2 Reliability

Research studies are required to have reliability in measuring the outcome of investigation. According to Heale & Twycross (2015), the term outlines the consistency in the results under assessment. This implies that similar results should be obtained when the tool is filled completely by the same participant. In other words, the data obtained should be homogenous and consistent at different times provided that the respondent is the same. To ensure reliability of the outcome, a pretest was conducted at Garsen Health Centre in Tana Delta Sub County that offers similar services as Ngao Sub-county Hospital. Again reliability was ensured through competitive selection and training of research assistants who took part in pretest exercise and data collection process. To accomplish this, 10% of the sample size, which were approximately 10 pregnant women were used.

3.11 Data Analysis and Management

3.11.1 Data Cleaning and Entry

The initial step was evaluating the data obtained through the questionnaires for completeness as assessed by the researcher. This was followed by manually sorting and cleaning the data to assess for comprehensiveness. Nonetheless, to avoid receiving questionnaires that are incomplete, the researcher ensured a follow-up of the participants while providing clarifications of all areas covered to ensure that every question got a feedback. Anonymity and confidentiality was ensured by concealing the

participant's identity where unique number was allocated to each respondent. However, no private information was obtained from the respondents. When this was done, the completed questionnaires were arranged systematically to facilitate entry into version 24 of the SPSS program.

3.11.2 Data Analysis and Interpretation

Data analysis was done with the aid of descriptive statistics. This method was preferred as the study questionnaire utilized closed questionnaires. The independent variables were assessed using measures of central tendency where calculations of mean and frequencies were done. The dependent variable was analyzed using measures of central dispersion to help establish the relationship. The data analysis was done at 95% confidence interval. The data was presented in frequency tables, pie charts, and bar graphs.

3.11.3 Data Storage

The data obtained was stored in the computer and ensured researchers' personal computer is password-protected to ensure no one has access to it. It's then duplicated to my personal email to facilitate recovery and protect it from viruses.

3.12 Study Findings and Outcome Dissemination Plan

The results of the study will be used to facilitate guiding the mothers on nutritional prospects in pregnancy at the ANC of Ngao Sub-county Hospital. During continuing medical education sessions (CMEs), the results can be shared with HCWs to facilitate delivery of services revolving around pregnant women. The results will also be presented to Mt. Kenya University, School of Postgraduate Studies School of Nursing. Upon approval of the study, the Ngao sub-county Hospital administration will be provided with a copy of the outcomes and a final copy delivered to the Mt. Kenya

University Library. The results of the study will also be published in scientific peer review nursing journal for public access.

3.13 Ethical Considerations

Ethical consent was sought from Mount Kenya University Research and Ethics Committee (ERC) and from the medical superintendent at Ngao Sub County Hospital. Further clearance was obtained from the National Commission of Science, Technology and Innovation (NACOSTI). This ensured that the study adheres to the recommendations set out by every department involved.

For the study subjects, an informed consent was sought from the respondents. The document clearly highlighted the details of the study and the expectations of the respondents. To ensure that permission is fully granted, the respondents had to sign the consent form. No coercion was extended to the respondents to comply with the requirements. In addition, the subjects were not subjected to any harm. Anonymity and confidentiality were ensured to conceal the identity of the subjects by making sure the participant's identity was concealed by use of unique number allocated to each respondent. Data security was guaranteed at all levels to protect the subjects from unintended persons.

3.14 Assumptions

The study operates on the following assumptions;

- i. That dietary practices by pregnant women are the leading cause of nutritional-related morbidities in pregnancy and childbirth
- ii. That pregnant women are constrained in one way or the other by

individual, social, cultural or even institutional elements that hinder them from achieving optimal nutritional intake.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and discussion of the study with reference to specific objectives of this research. Findings for each specific objective of the study listed in chapter one, they will be presented in separate sub sections following each other. First the study sought to study the individual characteristics of the respondents and their association with nutritional practices in pregnancy and this is presented in section 4.2. Section 4.3 presents results for objective two; social-cultural factors and how they are associated with nutritional practices in pregnancy. Section 4.4 presents results for objective three, facility-linked factors affecting nutritional practices in pregnancy among pregnant mothers attending their ANC clinic at Ngao Sub-County Hospital in Tana River County. Section 4.5 presents results for binary logistic regression for factors affecting nutritional practices in pregnancy.

The response rate for the study was 98% (n=86) which is acceptable according to Mugenda and Mugenda (2003), with a prevalence rate for good nutritional practices in pregnancy at 30.2% (n=26) of the participants. The level of nutritional practice was measured using a Likert scale with four options; regularly, sometimes, rarely and never practice good nutrition. This dependent factor was then categorized as good nutritional practices and poor nutritional practices. Good nutritional practice was associated with taking balanced diet regularly.

4.2 Individual Characteristics of the study participants

The study gathered information on the individual characteristics of the targeted mothers concerning their age, marital status, education level, employment status, and form of employment of the mothers. The study also explored other individual factors like who makes the financial decisions in the family, if the mother had experienced any health problem during the current pregnancy, knowledge on balanced diet and nutritional practice among the 86 mothers in Ngao hospital.

4.2.1 Age of the respondents

The age of the mothers was rounded-up into complete years and categorized as shown in figure 3. The study found that the mothers had varied ages. Majority (32.6%, n=28) had an age of 21-25 years, 24.4% (n=21) had an age of 31 years and above, 23.3% (n=20) had an age between 26-30 years and those aged between 15 and 20 years had the least proportion (19.8%, n=17). The age of the pregnant women was summarized in figure 3.

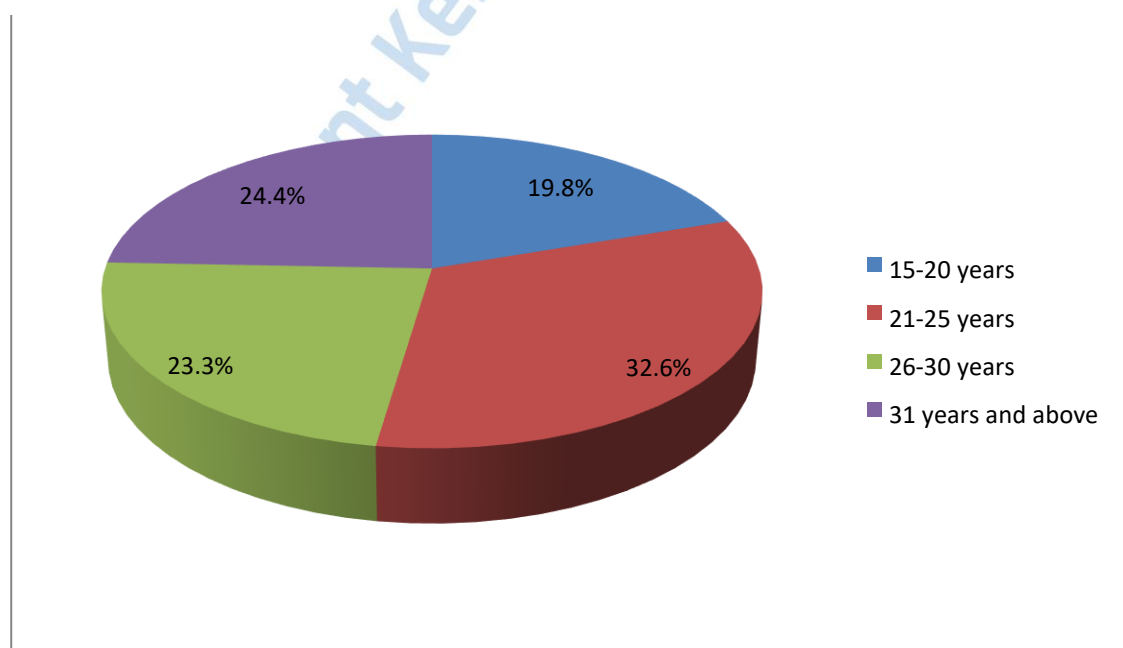


Figure 3: Age of the pregnant woman

On assessing the relationship between age and nutritional practice; out of 17 women who were in the age bracket of 15-20 years, 2 of them were found to have good nutritional practice, 10 of the mothers sometimes practiced good nutrition, 3 rarely practiced good nutrition and 2 of the mothers never practiced good nutrition. In the age group between 21-25 years, out of 28 participants, 5 of them had good nutritional practice, 11 of the mothers sometimes practiced good nutrition, 7 of the mothers rarely practiced good nutrition and 5 mothers never practiced good nutrition at all. In the age bracket of 26-30 years, out of 20, 5 had good nutritional practice, 10 were found to sometimes practice good nutrition, 3 rarely practiced good nutrition and 2 never practiced good nutrition. Among 21 mothers who were aged 31 years and above, 14 of them were having good nutritional practice, 5 mothers sometimes practiced good nutrition, and 2 never practiced good nutrition. Increase in age was strongly associated with increase of the chances of good nutritional practices with Phi of 0.504. These results were found to be significant at $\chi^2(9, N=86) = 21.831, p<0.001$, Fishers exact test p value<0.001.

Table 1: Association between age of the mother and nutritional practice

Variable	Age in	Nutritional practice				Total
	years 15-20	Regularly So	Sometimes	Rarely	Never	
Age of the mother	21-25	2	10	3	2	17
	26-30	5	11	7	5	28
	26-30	5	10	3	2	20
	Above 31	14	5	0	2	21
Total		26	36	13	11	86

$\chi^2(9, N=86) = 21.831$, Fisher exact p<0.001

Source: Field Data (2021)

A one-way analysis of variance was conducted to evaluate the mean differences between the age brackets in nutritional practices (N=88). The independent variable age of the mother included four groups; 15-20 years (M=2.41, SD=1.121, n=88), 21-25 years (M=2.61, SD=1.315, n=88), 26-30 years (M=2.20, SD=1.152, n=88) and above 31 years (M=1.62, SD=1.253, n=88). The assumption of homogeneity was evaluated using levene test and found tenable, $F(3,88)=.566$, $p=.639$. The ANOVA was significant $F(3,88)=2.802$, $p=.045$. In Post Hoc test using Bonferroni test to adjust the means, there was a significant difference between the age groups between 21-25 years and above 31 years.

Table 2: one-way analysis of variance for age

	Sum of squares	df	Mean square	F	Sig.
Between groups	12.400	3	4.133	2.802	.045
Within groups	120.949	82	1.475		
Total	133.349	85			

Source: Field Data (2021)

In this study, it is evident that as the maternal age increases, the nutritional practice improves. The older mothers' practice of good nutrition may be attributed to the fact that they have experience and less competing interests. Every mother has food preferences; however, the young mothers in most cases prefer foods that do not add nutritional value in their bodies. At Ngao Sub-County hospital, the older mothers were found to have good nutritional practice, this replicates studies done in India and Brazil that revealed that the older a mother is, the more adherent they are to good nutrition during pregnancy (teixeir *et al.*, 2018; Eshriqui *et al.*, 2016.,Gomes *et al.*, 2019). Age of the mother is therefore critical when it comes to nutritional practice, the health care

workers need to consider this parameter when counseling the young mothers on nutritional intake.

4.2.2 Marital status of the mother

Majority (77.9%, n=67) of the mothers were married, others were single and a small proportion of the mothers had been divorced (9.3%, n=8).

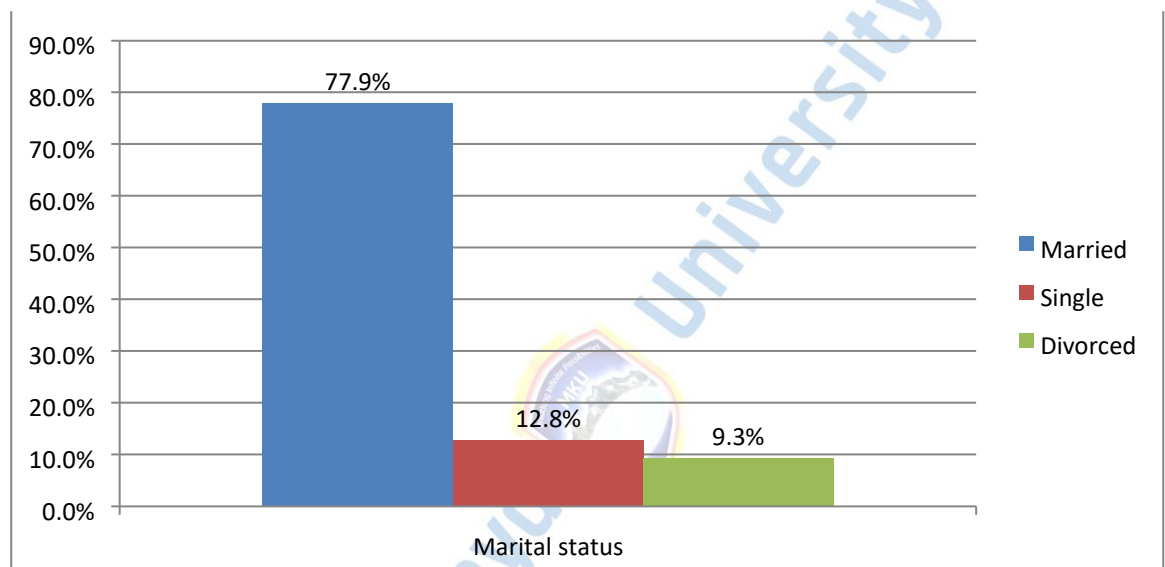


Figure 4: Marital status of the participants

On analysis of how marital status affected nutritional practices among pregnant mothers, out of 67 mother who reported to be married, 20 had good nutritional practice, 25 reported to sometimes practice good nutrition, 11 mothers rarely practiced good nutrition and another group of 11 mothers never practiced good nutrition. Among 11 mothers who were single, 3 had good nutritional practice, 7 mothers reported to sometimes practice good nutrition, one mother rarely practiced good nutrition. Out of 11 mothers who had been divorced by the time of the study 3 had good nutritional practice, 4 sometimes practiced good nutrition, and one mother rarely practiced good

nutrition. There was a weak association between marital status and practice of good nutrition with Cramer's V of .177. These results were not statistically significant in determining nutritional practice at $\chi^2 (6, N=86) = 5.373, p=0.497$, Fishers exact test p value=0.258.

Table 3: Association between marital status of the mother and nutritional practice

Variable	Marital status	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Marital status of the mother	Married	20	25	11	11	67
	Single	3	7	1	0	11
	Divorced	3	4	1	0	8
Total		26	36	13	11	86

$\chi^2 (6, N=86) = 5.373$, Fisher exact test p=0.497

Source: Field Data (2021)

In the current study marital status of the mother did not significantly affect their nutritional practice, this may be due to other confounding factors like maternal financial status. If the mother is financially stable, there is a likelihood of her to practice good nutrition irrespective of their marital status. In cases where the maternal financial status is not stable; the mother depends on the husband for provision of food, then there might be chances of marital status affecting nutritional practices. These results are contrary to the findings of Amega *et al.*, (2018) which showed that marital status is a significant determinant of nutritional practices in pregnancy. The contrast might be due to other factors like availability and affordability of the food at the area of study. If the food is available and affordable, then the current research proves that marital status will not affect nutritional practices of the mother.

4.2.3 Level of education of the mother

The study findings revealed that the majority of the mothers had secondary level of education 27 (31.4%). The highest level of education attained among the sampled mothers was university level (2.3%, n=2) and the lowest was no formal education (16.3%, n=14). There were 26 (30.2%) mothers with primary level of education, and 17 (19.8%) mothers had college level of education.

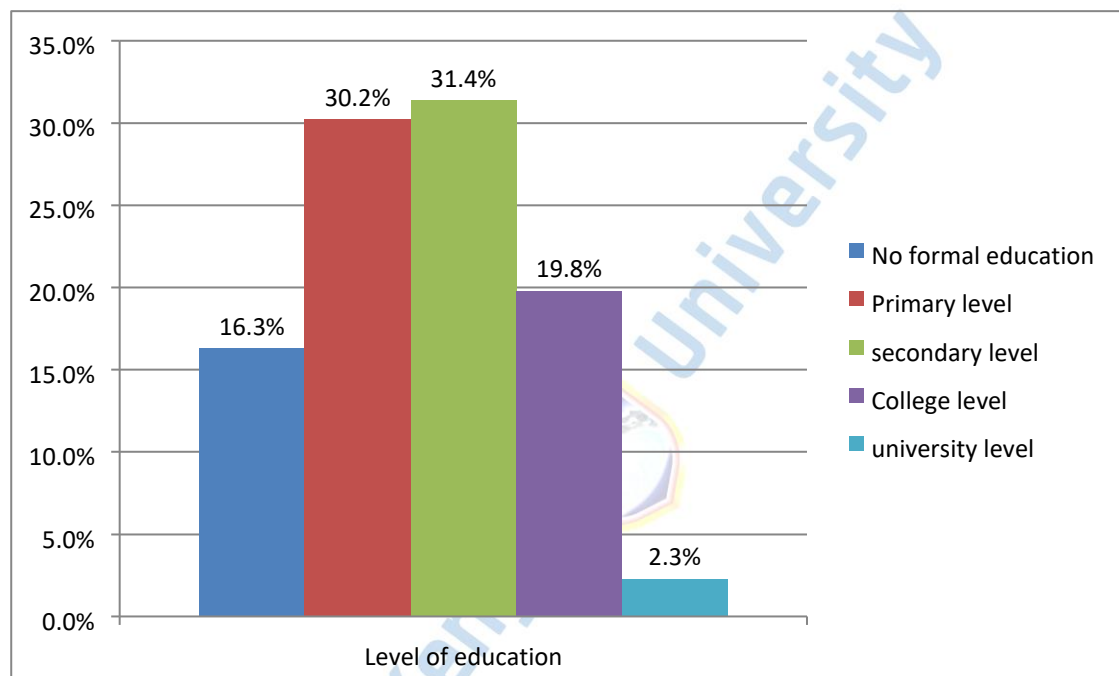


Figure 5: Highest level of education of the participant

As shown in figure 5 above, the level of education was varying among the mothers who participated in the study. Out of 14 mothers who had no formal education, one had good nutritional practice, 4 reported to sometimes practice good nutrition, 2 rarely practiced good nutrition, and 7 mothers never practiced good nutrition. Among the 26 mothers who had primary level of education, one had good practice of nutrition, 14 indicated to sometimes practice good nutrition, eight mothers rarely practiced good nutrition and three never practiced good nutrition. Also, among the 27 mothers who had secondary

level of education, 6 mothers were found to practice good nutrition, 17 mothers reported to sometimes practice good nutrition, three mothers rarely practiced good nutrition and one mother was found to have never practiced good nutrition.

Among those who indicated to be in college, 16 of the mothers had good nutritional practices, and 1 mother reported to sometimes practice good nutrition, and the two mothers with university level of education had good nutritional practice. These results show that as the level of education increases, the practice of good nutrition increases; this was indicated by a positive correlation between level of education and nutrition practice of Spearman's Rho (r) of .530 and Phi value of .917. On computation, these results were found to be statistically significant at $\chi^2 (12, N=86) = 72.387, p<0.001$

Table 4: Highest level of education

Variable	Level of education	nutritional pra				Total
		Regularly	Sometimes	Rarely	Never	
Highest level of education of the mother	No formal education	1	4	2	7	14
	Primary level	1	14	8	3	26
	Secondary level	6	17	3	1	27
	College level	16	1	0	0	17
	University level	2	0	0	0	2
Total		26	36	13	11	86

$\chi^2 (12, N=86) = 72.387, p<0.001$

Source: Field Data (2021)

A one-way analysis of variance was conducted to evaluate the mean differences between the levels of education in nutritional practices (N=86). The independent variable level of education of the mother included five groups; no formal education (M=3.57, SD=1.555, n=88), primary level of education (M=2.62, SD=1.023, n=88), secondary level of education (M=2, SD=.832, n=88), college level of education (M=1.06, SD=.243, n=88), and university level of education (M=1, SD=.000, n=88). The assumption of homogeneity was evaluated using levene test and found not tenable, $F (4,86) =12.220, p=.000$, therefore Welch robust test of equality of means was used instead $F (4,86)=11.781, p=.028$. The ANOVA was significant $F (4,86)$

=56.825, p=.000.

Table 5: One-way analysis of variance between education levels of the participants

	Sum of squares	df	Mean square	F	Sig.
Between groups	56.825	4	14.206	15.037	.000
Within groups	76.524	81	.945		
Total	133.349	85			

Source: Field Data (2021)

The actual differences were evaluated using Post Hoc test using Turkey HSD test to adjust the means, there was a significant difference between the no formal education level and university level of education, primary level of education, secondary level of education, college level of education and university level of education. There was also difference between means of primary level of education and college level of education but no significant difference between primary level of education and that of secondary and university levels of education and finally the findings indicated a significant difference between secondary level of education and college level of education. However, there was no significant difference between college level of education and university level of education.

It is evident that the current study points out that as the level of education increases, it increases the level of awareness of the mother about foods needed in pregnancy. The increase in knowledge compounded by knowledge on balanced diet increases the chances of good nutritional practices. These findings concur with the previous studies done in Brazil, China and Ghana, which showed that mothers with higher level of education have good nutritional practices (Amega *et al.*, 2018; Oh, Kang, Cho, Ju, & Faye 2019; Lee *et al.*, 2016).

Table 6: Mean differences for various levels of education of the participants

	N	Mean	Std. Deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
No formal education	14	3.57	1.555	.416	2.67	4.47	1	5
Primary level	26	2.62	1.023	.201	2.20	3.03	1	5
Secondary level	27	2.00	.832	.160	1.67	2.33	1	5
College level	17	1.06	.243	.059	.93	1.18	1	2
University level	20	1.00	.000	.000	1.00	1.00	1	1
Total	86	2.23	1.253	.135	1.96	2.50	1	5

Source: Field Data (2021)

4.2.4 Employment status of the participant

Majority of the participants (68.6%, n=59) reported to be unemployed with only 31.4% (n=27) mothers reporting to be employed by the time of the study. When the employment status of the participant was cross tabulated with nutritional practice, out of the 27 mothers who reported to be employed, 19 of them had good nutritional practice while 15 mothers had poor nutritional practice. Among the 59 mothers who were unemployed, only seven mothers were found to have good nutritional practice. There was a moderate correlation between employment status and good nutritional practice with Cramer's v of .452. The mothers who were employed were 0.510 times more likely to practice good nutrition than the unemployed mothers (AOR=0.510, CI

[0.344-0.755]). These results were statistically significant at $\chi^2 (1, N=86) = 26.8877$, $p < 0.001$. These results indicate that availability of funds or money for the purchase of food is critical in nutritional practices among pregnant mothers. Previous studies in Brazil also agree with these findings that financial stability is important in determining nutritional practices. The current study used employment; both formal and self-employment as an indicator for financial stability. The mothers who do not have a source of income are likely to depend on either their husbands or other family members for support. In such case, they do not have the power to decide what to eat and when. This can be very detrimental to the fetus and the baby after birth in terms of either prematurity or low birth weight or sometimes miscarriage.

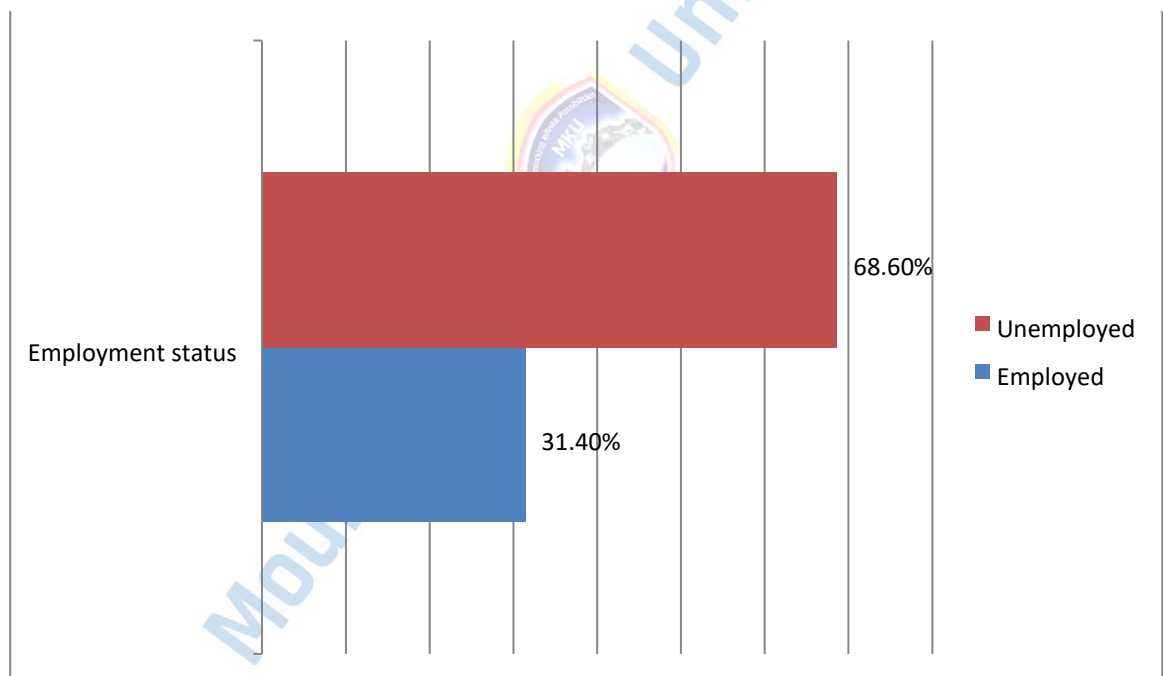


Figure 6: Employment status of the participant

Among those who were employed, 12 (44.4%) were formally employed in public service, 12 (44.4%) more mothers reported to be self-employed, and 3 (11.2%) mothers were casual workers in companies.

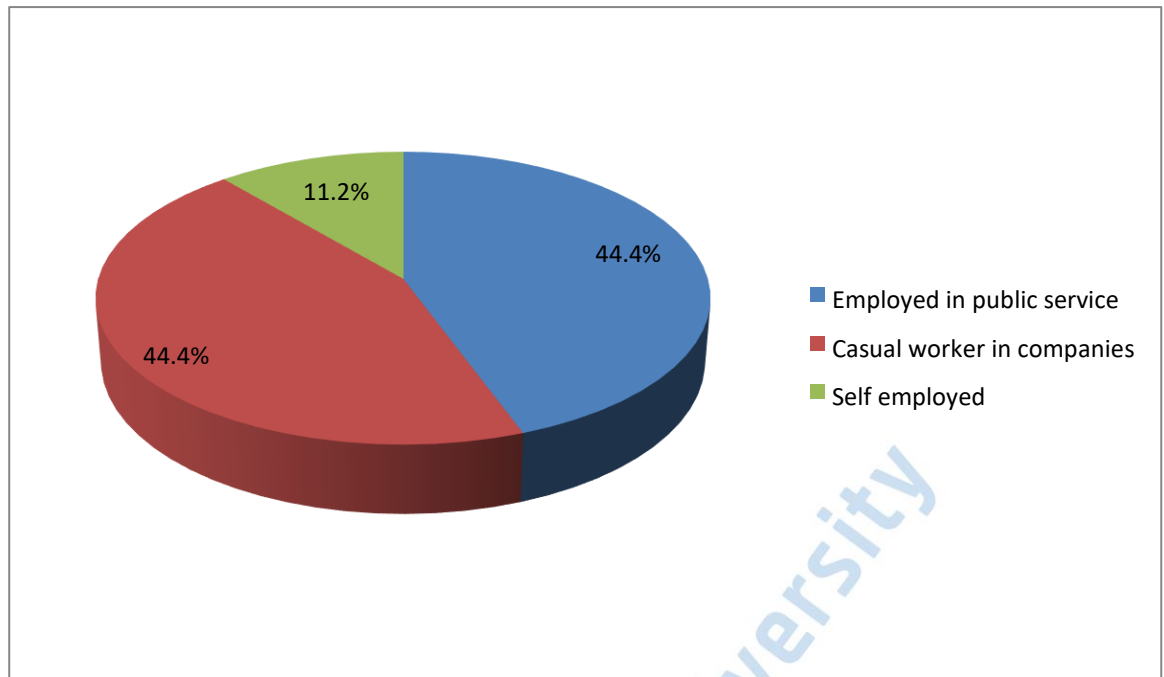


Figure 7: Form of employment of the employed participants

Table 7: Employment status of the mothers

Variable	Employment status	Nutritional practice		Total
		Good	Poor	
Employment status of the mothers	Employed	19	10	29
	Unemployed	7	50	57
Total		26	60	86

$$\chi^2(1, N=86) = 26.8877, p < 0.001$$

Source: Field Data (2021)

4.2.5 Financial decision maker in the family

Majority of the participants (47.4%, n=41) reported that it is the role of the husband to allocate the finances in the family including the purchase of food in their houses. The remaining participants, 30.2% (n=26) reported that they discuss with the husband and come up with a budget while 22.1% (n=19) reported to decide on their own about the family finances.

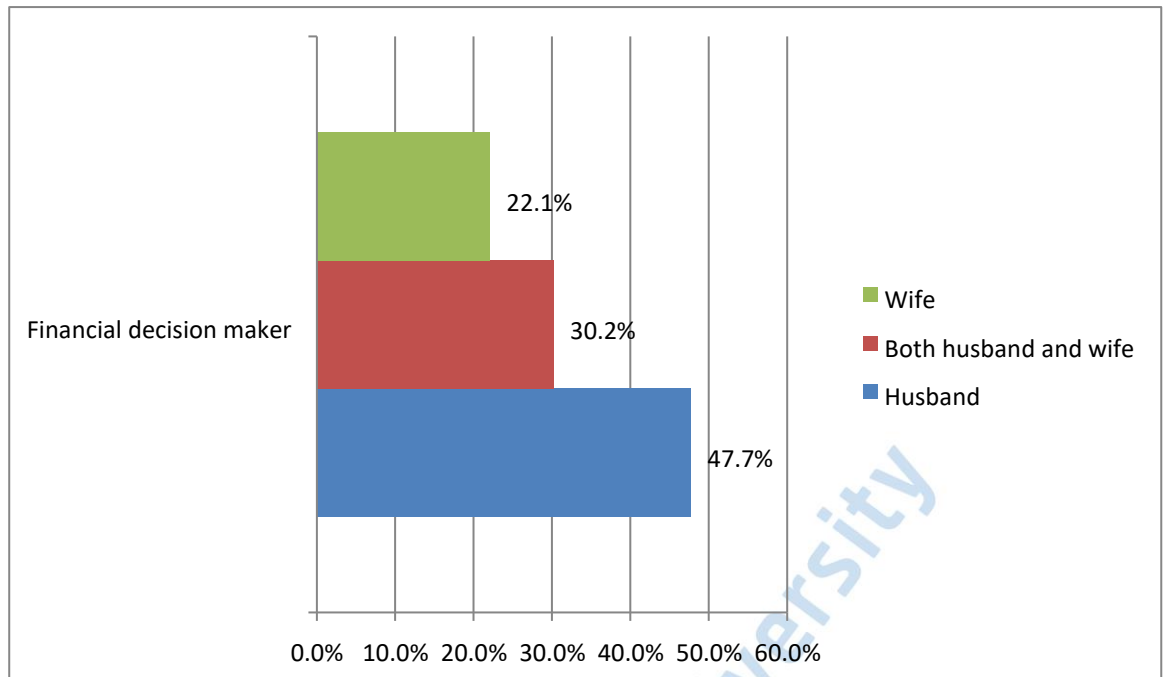


Figure 8: Financial decision maker in the family

There was a strong association between the person who decides on finances and good nutritional practice with Cramer's v value of .579. Out of 27 mothers who reported to be making financial decisions on their own 22 of them had poor nutritional practice. Out of the 31 mothers whose husbands made financial decisions, 17 had good nutritional practices and among the 30 who share and discussed about their finances as a husband and a wife, only 4 had good nutritional practice. These results were found to be statistically significant at $\chi^2(2, N=86) = 28.873, p < 0.001$. **Table 8: Financial decision maker in the family**

Variable	Category	Nutritional practice		Total
		Good	Poor	
Financial decision maker in the family	Wife	5	22	27
	Husband	17	12	29
	Both husband and wife	4	26	30
Total		26	60	86

$\chi^2(2, N=86) = 28.873, p < 0.001$ Source:

Field Data (2021)

4.2.6 Experience of health problem that led to food restriction

The study findings indicated that majority of the participants (82.6%, n=71) had not experienced any health problem that restricted their food intake. However, 17.4% (n=15) had experienced health problems that restricted their food intake.

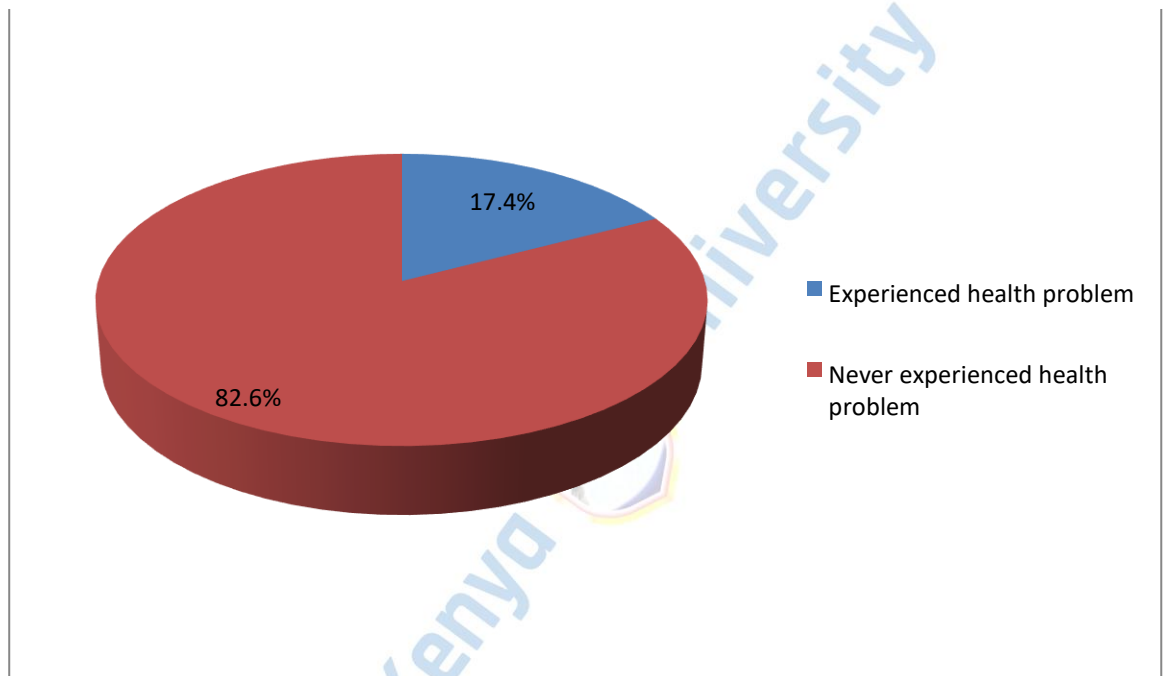


Figure 9: Experience of health problem that restricted the participants' food intake

Among the study participants who experienced health problem that led to restriction of their food intake, they reported to be restricted in taking; vegetables and acidic foods (3.5%, n=3), fatty foods (1.2%, n=1), sukuma wiki (2.3%, n=2), eggs (1.2%, n=1), beans (4.7%, n=4), legumes (2.3%, n=2), salty junky foods (1.2%, n=1), and carbohydrates (1.2%, n=1). The results indicated a moderate association between having a health problem that restricts dietary intake at Cramer's v value of 0.275.

However, the experience of a health problem that led to restriction of the diet of the participant was not significantly associated with practice of good nutrition at $\chi^2 (3,$

$N=86) = 0.382, p=0.944$.

4.2.7 Knowledge on balanced diet.

The study findings showed that majority of the participants (84.9%, $n=73$) were aware of what balanced diet entails.

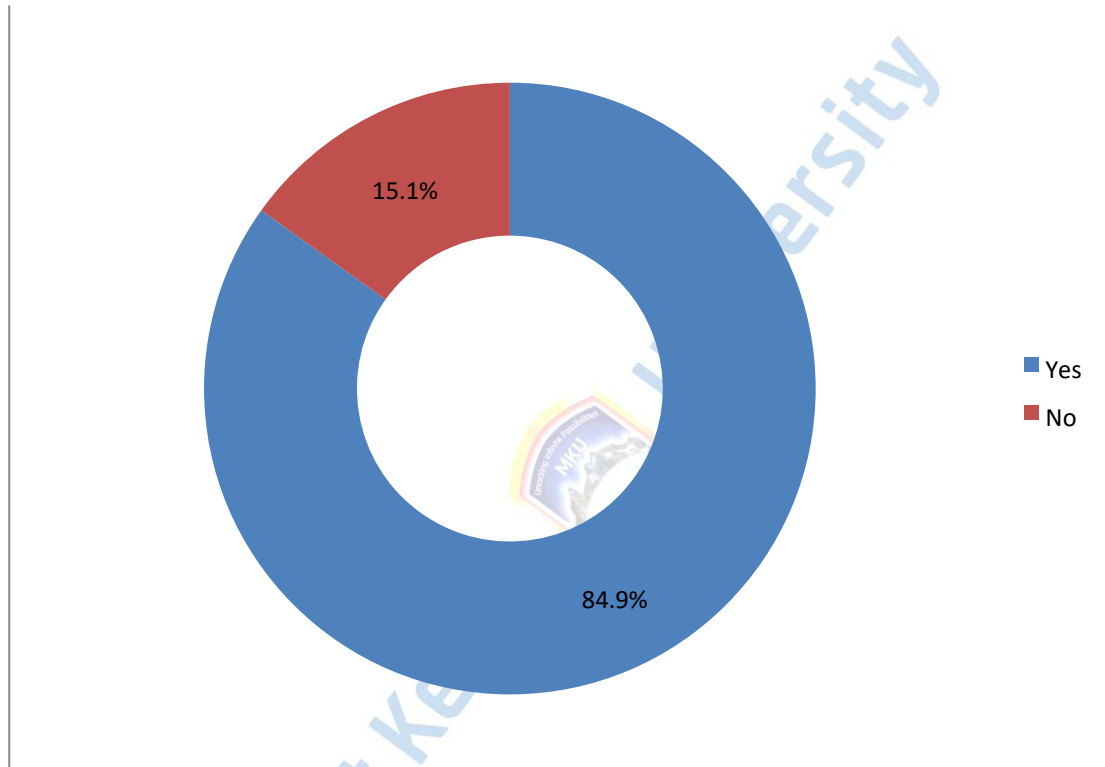


Figure 10: Participant knowledgeable on balanced diet.

Among the participants who were aware what balanced diet entailed, 25 of the participants regularly practiced good nutrition, 36 of the mothers reported to sometimes practice good nutrition, and 12 mothers rarely practiced good nutrition. Among those who were not aware of what a balanced diet entailed, one mother was found to regularly practice good nutrition, another one mother rarely practiced good nutrition and 11 mothers never practiced good nutrition. The results showed that there is a strong association between knowing what a balanced diet entails and practice of good nutrition

at Cramer's v of 0.911 and a positive correlation of Spearman's (r) of 0.898. Therefore, the results had statistically significant effect on nutritional practice among pregnant mothers at $\chi^2 (3, N=86) = 71.312$, Fisher exact test $p < 0.001$. Having knowledge on balanced diet increase the chances of preparing a balanced diet, these results concur with those of Lee *et al.*, (2016). Knowledge on balanced diet was positively correlated with education level of the mother and had high colinearity; therefore, highest level of education may be a confounding factor to knowledge on balanced diet.

Table 9: Knowledge on balanced diet.

Variable	Aware of what a balanced diet entails	Regularly	Nutritional practice Sometimes	Rarely	Never	Total
Knowledgeable on balanced diet	Yes	25	36	12	0	73
	No	1	0	1	11	13
Total		26	36	13	11	86

$\chi^2 (3, N=86) = 71.312$, Fisher exact test $p < 0.001$

Source: Field Data (2021)

4.2.8 Practice of good nutrition

The practice of good nutrition was measured using a Likert scale which had four categories based on taking a balanced diet, the categories were; regularly, sometimes, rarely and never. The study findings revealed that 26 (30.2%) mothers regularly took a balanced diet, 36 (41.9%) mothers reported to be taking a balanced diet occasionally or sometimes, 13 mothers (15.1%) rarely took a balanced diet and 11 mothers (12.8%) never took a balanced diet. The nutritional practice then categorized into good practice and poor practice based on taking a balanced diet regularly and this revealed that only

26 mothers had good nutritional practice while 60 mothers were found to have poor nutritional practice.

Table 10: Nutritional practice

Variable	Category	Frequency	Percentage
Nutritional practice	Good	26	30.2
	Poor	60	69.8
Total		86	100

Source: Field Data (2021)

4.3 Socio-cultural factors affecting nutritional practice among pregnant mothers

4.3.1 Effects of religion on nutritional practice

Majority of the participants in the study (53.5%, n=46) were Christians while 46.5% (n=40) participants were Muslims by religion. However, the religion of the participants never affected their nutritional practices.

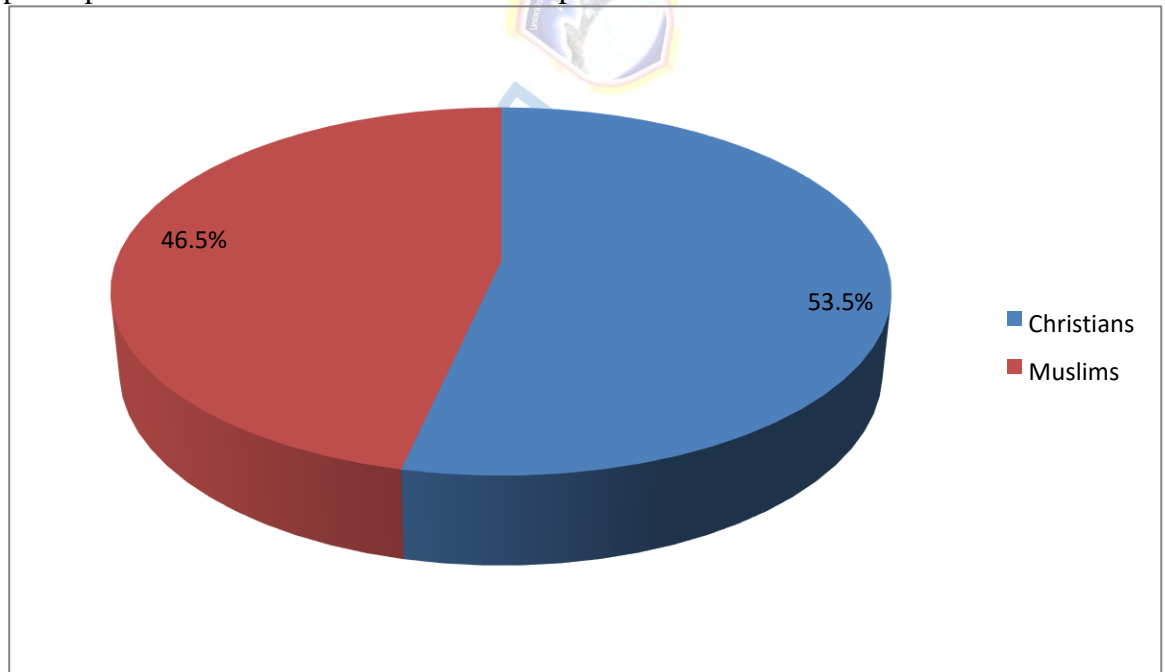


Figure 11: Religion of participants

Despite the fact neither of the religious affiliation affected or restricted dietary intake, it was evident from the results that majority of the Christians had good nutritional practice compared to Muslims. These results were significant at $\chi^2(1, N=86) = 13.501$, Fisher exact test $p < 0.001$. A positive correlation was found between Christianity and good nutritional practices. The Christians were 4.564 times more likely to practice good nutrition than Muslims (AOR=4.564, CI [1.718-12.125]). There was also a positive correlation between Christianity and good nutritional practice at Spearman's (r) of 0.396.

Table 11: Association between religious affiliation of the participant and nutritional practice

Variable	Religious affiliation	Nutritional practice		Total
		Good	Poor	
Religious affiliation of the participant	Christian	22	25	47
	Muslim		35	39
Total		26	60	86

$\chi^2(1, N=86) = 13.501$, Fisher exact test $p < 0.001$

Source: Field Data (2021)

These results show that some religious beliefs restrict specific food intake. This can be during pregnancy or the normal life. Other religions emphasize that the life of a person is under Gods' control and therefore taking food or not does not matter a lot. In pregnancy, there is extra demand for nutrients which need to be available for health growth of the fetus, therefore, if the mother does not take enough of the nutrients, the fetus suffers. It is therefore important to understand the specific religious beliefs that restrict specific foods needed in pregnancy so that advice can be given to the mothers accordingly. The current study did not investigate on the specific beliefs. In comparison

with other studies previously done, it is important to note that in Ghana, Graham *et al.*, (2015) also found that religious beliefs affected nutritional intake among pregnant mothers. In some cases, there exists food taboos, that if you eat certain foods when pregnant you are likely to bear a child with abnormalities or get miscarriage as it has been reported in Ethiopia (Mohammed *et al.*, 2019; Swihart *et al.*, 2019).

4.3.2 Effects of culture on nutritional practices

It was found from the study results that some mothers were restricted from taking some foods according to their culture. In the study, majority of the mothers (87.2%, n=75) had no food or dietary restrictions according to their culture. However, a few mothers (12.8%, n=11) had been restricted not to take specific foods taught to have consequences in their pregnancy according to their culture.

Table 12: Culture restricts food intake in pregnancy

Variable	Category	Frequency	Percentage
Your culture restricts any type of food intake during pregnancy	Yes	11	12.8
	No	75	87.2
Total		86	100

Source: Field Data (2021)

The mothers who reported to be restricted in taking some foods in pregnancy were probed more on specific foods that are prohibited. It was indicated from the results that the foods restricted during pregnancy included; wild meat (10.5%, n=9), porcupine meat (1.2%, n=1), eggs (1.2%, n=1), rolled vegetables like cabbage (1.2%, n=1), avocado (1.2%, n=1) and the larger proportion of the mothers (84.9%, n=73) reported not to believe in those restrictions.

According to the belief of the respondents, those who adhered to the cultural beliefs reported that in case a pregnant woman took the prohibited food during pregnancy, she was likely to experience some consequences. Some of the consequences highlighted included; difficult labor (10.5%, n=9), rude baby (2.3%, n=2), big baby (1.2%, n=1) and majority of the mothers (86%, n=74) were not aware of any consequence that can befall a mother if she took the prohibited food during pregnancy.

Among the participants who reported to be restricted by their culture on which food to take, 9 mothers regularly took their balanced diet hence practicing good nutrition, and two mothers reported to sometimes practice good nutrition. It was also noted that among those who were not restricted by their culture on dietary intake during pregnancy, 17 mothers had good nutritional practice, 34 mothers sometimes practiced good nutrition, 13 mothers rarely practiced good nutrition, and 11 of the mothers never practiced good nutrition. These results showed a moderate association between culture and nutritional practice at Spearman's (r) of 0.436 and were statistically significant at χ^2 (3, N=86) = 16.312, Fisher exact test $p < 0.001$. **Table 13: Effects of culture on nutritional practice in pregnancy**

Variable	Culture restricts food intake during pregnancy		Nutritional practice			Total
	Yes	No	Regularly	Sometimes	Rarely	
Effects of culture on nutritional practice	9	2	17	34	13	11
Total			26	36	13	11

χ^2 (3, N=86) = 16.312, Fisher exact test $p < 0.001$

Source: Field Data (2021)

The current study depicts those cultural beliefs affect nutritional practices, however, the study did not explore the specific cultural beliefs that prohibit pregnant mothers from taking specific foods in pregnancy. The beliefs that if you eat eggs during pregnancy you will experience difficult labor or get big baby still lingers in the mind of many mothers in Tana River County. It was reported in the study that some mothers fear and other do not eat eggs because of such belief. Other foods like rolled vegetables (Cabbage) and wild meat are also prohibited. Restricting pregnant mothers from taking

proteins is exposing the same mothers to anemic conditions known to be detrimental to the life of the fetus. These results are in agreement with previous studies done in China (Marquis & Jensen, 2015) which showed that eating a lot of proteins is prohibited in pregnancy especially eggs.

4.4 Facility-linked factors affecting nutritional practice

4.4.1 Health education on nutrition during pregnancy

The mothers reported that during ANC they were taught about nutrition during pregnancy. This was indicated by the majority (81.4%, n=70) while a few (18.6%, n=16) reported not to have been counseled on nutrition during pregnancy.

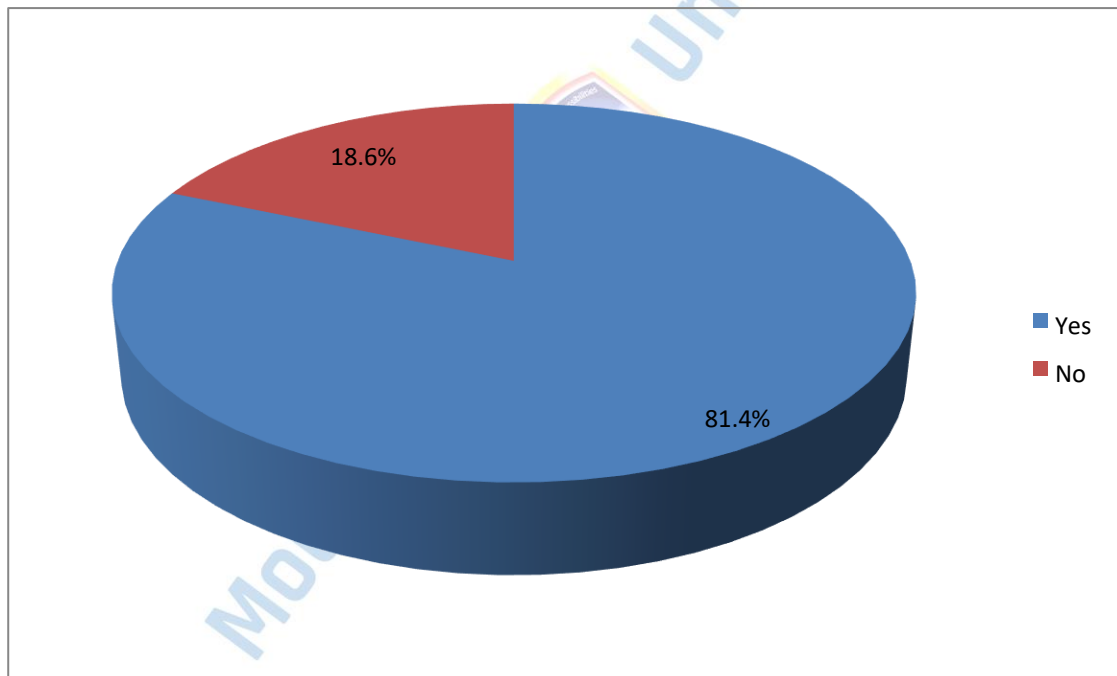


Figure 12: The participant was offered nutritional counseling during pregnancy

Among those who received nutritional counseling during pregnancy, 25 mothers were found to practice good nutrition, 31 others reported to sometimes practice good nutrition, 10 mothers rarely practiced good nutrition and four mothers never practiced good nutrition. On assessing the mothers who reported not to have been counseled on

nutrition during pregnancy, one mother was found to have good nutritional practice, five mothers reported to sometimes practice good nutrition, three mothers rarely practiced good nutrition and seven mothers reported to never have been practicing good nutrition during pregnancy. These results showed a moderate association between nutritional counseling during pregnancy and good nutritional practice at Cramer's v value of 0.472 and were statistically significant at $\chi^2(3, N=86) = 19.170$, Fisher exact test $p < 0.001$. Nutritional counseling is critical especially in pregnancy, Murage-Kimani (2019) revealed that the mothers counseled on their nutritional intake regardless of their education level, had good nutritional practices. This is in agreement with the findings of the current study.

Table 14: Association between nutritional counseling and good nutritional practice

Variable	Counsel on nutrition during pregnancy	Regularly nutritional pra			Never	Total		
		Sometimes	Rarely					
Effects of nutritional counselling during pregnancy on nutritional practice	Yes	25	1	31	10	3	4	70
	No			5			7	16
Total		26		36	13		11	86

$\chi^2(3, N=86) = 19.170$, Fisher exact test $p < 0.001$

Source: Field Data (2021)

4.4.2 Use of nutritional models during nutritional counseling

The participants indicated that the nutritional counseling was done using nutritional models to enhance understanding. This was reported by majority of the mothers (68.6%, $n=59$) that use of nutritional pyramid helped them understand on the proportions of each food type.

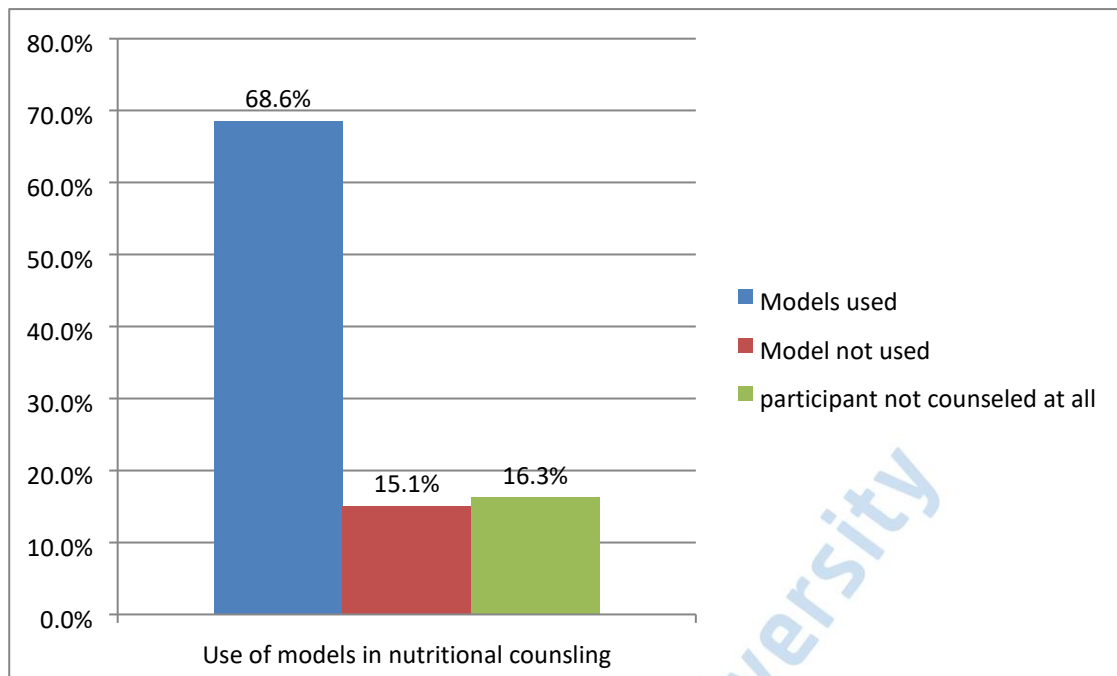


Figure 13: Use of nutritional models in nutritional counseling to enhance understanding

Among those who were counseled using nutritional models, 23 mothers were practicing good nutrition, 25 mothers sometimes practiced good nutrition, 9 mothers rarely practiced good nutrition and two mothers never practiced good nutrition. Also, among those who were counseled but not using nutritional models, two mothers had good nutritional practices, six sometimes practiced good nutrition, one mother rarely practiced good nutrition and four other mothers reported never to have practiced good nutrition during pregnancy. It was also noted that among those who were never counseled either using the model or not, one mother had good nutritional practice, five mothers sometimes practiced good nutrition, three mothers rarely practiced good nutrition and four more mothers reported never to have practiced good nutrition during pregnancy. There was a strong positive correlation between being counseled using nutritional model and good nutritional practice at Spearman's (r) of 0.471 and these results were statistically significant at $\chi^2(6, N=86) = 19.056$, Fisher exact test $p < 0.001$

Table 15 Association between use of nutritional model during nutritional counseling and good nutritional practice

Variable	Response	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Use of nutritional model during nutritional counselling to enhance understanding	Model used	23	25	9	2	59
	Model not used	2	6	1	4	13
	Never counselled at all	1	5	3	5	14
Total		26	36	13	11	86

$\chi^2(6, N=86) = 19.056$, Fisher exact test $p < 0.001$

Source: Field Data (2021)

Previous studies concentrated on nutritional counseling and gave minimal attention on modalities of doing the counseling. The current study explored the use of nutritional models (pyramids) as teaching aid to foster understanding of dietary intake. The study revealed significant results, that use of the models enhances understanding of the counseling given.

4.4.3 Use of nutritional supplements

The participants reported to have been give nutritional supplements during ANC clinics. However, majority of the mothers (60.5%, n=52) never got the micronutrient supplements at the facility.

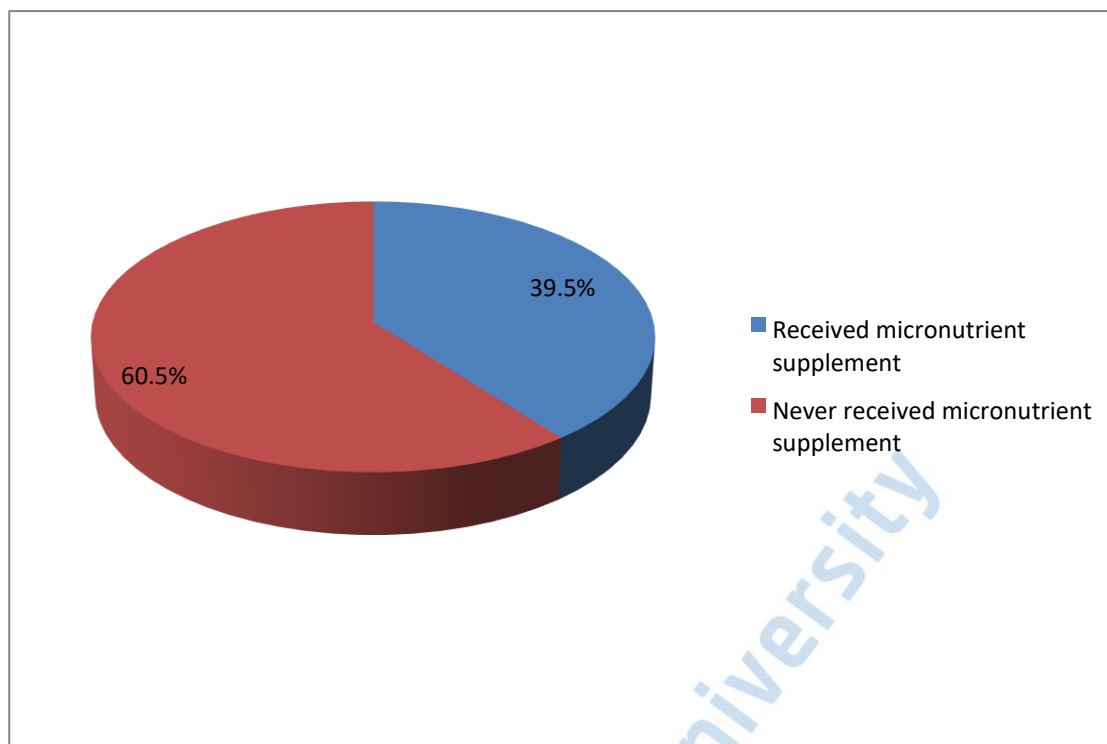


Figure 14: Reception of micronutrient supplement during ANC visits

Among those who received the supplement, 15 mothers had good nutritional practice, ten mothers reported to sometimes practice good nutrition, six mothers rarely practiced good nutrition and three mothers never practiced good nutrition. Also, among those who never received the supplements, 11 mothers had good nutritional practice, 26 mothers sometimes practiced good nutrition, seven mothers rarely practiced good nutrition, and eight mothers never practiced good nutrition. There was a moderate association between reception of micronutrient supplement and good nutritional practice at Cramer's V value of 0.304 and these results were statistically significant at $\chi^2(3, N=86) = 7.968$, Fisher exact test $p=0.047$. Previous studies had also shown similar findings that the mothers advised and given supplements had good nutritional practices (Sunuwar *et al.*, 2019). Also, in Ethiopia, Winter *et al.*, (2019) found out that giving of iron and folic supplements to the mothers replenished the nutrient stores.

Table 16: Association between reception of micronutrient supplement at the facility during ANC visits and good nutritional practices.

Variable	Response	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Reception of micronutrient during ANC visits	Yes	15	10	6	3	34
	No	11	26	7	8	52
Total		26	36	13	11	86

$\chi^2(3, N=86) = 7.968$, Fisher exact test $p=0.047$

Source: Field Data (2021)

4.5 Regression analysis of significant factors that affect nutritional practices during pregnancy

After adjusting for all confounding factors and checking for model fit, all the significant factors were entered into binary logistic regression using dependent variable as nutritional practices which had two categories; good nutritional practice and poor nutritional practice. After computing forward stepwise regression at an entry point of 0.05 and removal point of 0.1 and 95% confidence interval, the researcher developed one model that was found fit for the factors determining nutritional practices.

Table 17: Variables in the equation

	B	S.E	Wald	df	Sig.	Exp (B)
Step 0 constant	-0.836	0.235	12.685	1	.000	.433

Source: Field Data (2021)

Table 18: Omnibus tests of model Coefficients

		Chi-square	df	Sig.
Step 1	Step	48.030	3	.000
	Block	48.030	3	.000

Model	48.030	3	.000
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Source: Field Data (2021)

Table 19: Model Summary

Step	-2 log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	35.653	.556	.787

Source: Field Data (2021)

Table 20: Variables in the equation

	B	S.E	Wald	df	Sig.	Exp EXP(B)	95% C.I for (B)	
							Lower	Upper
Step1								
What is your highest level of education?	2.819	.811	12.098	1	.001	16.768	3.424	82.125
Are you in any form of employment?	-.2226	.960	5.373	1	.020	.108	.16	.709
Does your culture restrict any type of food intake?	-3.178	1.331	5.698	1	.017	.042	.03	.566
Were you given micronutrient supplements at the facility during your visits?	-3.338	1.221	7.467	1	.006	.036	.03	.389
Constant	5.172	3.167	2.667	1	.102	176.338		

Source: Field Data (2021)

The results after adjusting for confounding factors indicated that the main determinants of good nutritional practice among mothers attending their ANC visits at Ngao Sub-County hospital were; having education level of secondary level and higher, having a source of income especially being in employment, cultural food restrictions negatively

affected nutritional practices, and the mother who were given micronutrient supplements at the facility during ANC visits were found to have good nutritional practices.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the results, followed by the conclusion drawn from the results and finally makes recommendations for; practice, policy makers and future research. The study assessed individual characteristics of the mothers affecting their nutritional practices, socio-cultural factors affecting nutritional practices and facility-linked factors affecting nutritional practices among pregnant mothers. Each of these objectives was assessed using varied number of items.

5.2 Summary of the findings

5.2.1 Individual factors affecting nutritional practice

The response rate for the study was 98%. The majority of the mothers (32.6%, n=28) were having their ages range between 21-25 years. When age was associated with nutritional practice, the relationship was significant at p value $<.05$. The older mothers were more likely to practice good nutrition than the young mothers were. Marital status ranged from single mothers (12.8%, n=11), Divorced mother (9.3%, n=8) to married mothers (77.9%, n=67). However, marital status did not have significant results on determining nutritional practices in pregnancy.

The highest level of education was found to be influencing nutritional practices significantly. The higher the level of education the higher the probability of good nutritional practices. The mothers with above primary level had higher prevalence of good nutritional practices compared to those with no formal education. The mothers reported to be employed (31.4%, n=27) and others not (68.9%, n=59). Those who were employed were either in public service (14%, n=12) or self-employment sector (14%,

n=12). Irrespective of the form of employment, the findings revealed that employment was critical in determining nutritional practices in pregnancy.

The study also assessed who made financial decisions in the family of the participant. Some reported to be making the decisions by self (22.1%, n=19), others discussed with the husband (30.2%, n=26) and others the husband made the decision (47.7%, n=41).

Experience of health problem restricting certain food intake was taught to influence nutritional practices. The study findings indicated that having a health problem that restricted a mother from taking certain foods did not significantly affect their nutritional practices. The foods the mothers were restricted from included; sukuma wiki, acidic foods and legumes. On knowledge on balanced diet, the mothers were knowledgeable (84.9%, n=73). Having the knowledge on balanced diet significantly determined nutritional practices but was found to be confounded by mothers' level of education. Hence the null hypothesis was rejected.

5.2.2 Socio-cultural factors determining nutritional practices

The study assessed the religious affiliations of the participants and if the religion restricted them from taking certain foods in pregnancy. The study findings indicated that the participants were either Christians (53.5%, n=46) or Muslims (46.5%, n=40). The Christians were more likely to practice good nutrition compared to Muslims. However, the study showed that the participants were not restricted from taking any of the foods during pregnancy by their religion.

Cultural beliefs of the participants was found to be significantly determining nutritional practices of the mothers involved in the study. The culture of the mothers restricted them from taking certain foods especially proteins and this predisposed them to anemia. Some of the foods prohibited were proteins and these are major source of amino acids

needed for fetal growth. However, the study did not explore the specific cultural beliefs prohibiting dietary intake. Some mother feared eating the prohibited foods for fear of unknown consequences. It was evident from the respondents that they believe if the prohibited food is eaten, the mother will bear a baby with abnormalities.

5.2.3 Facility-linked factors determining nutritional practices

Three factors were assessed among the mothers. First, the mothers were assessed if they received nutritional counseling. Majority (81.4%, n=70) reported that they had received nutritional counseling during ANC visits. Among those counseled, nutritional practices were good. Secondly, use of nutritional models in counseling was assessed and results showed 68.6% (n=59) mothers had been counseled using nutritional models; these results too were significantly determining nutritional practices. Thirdly, the mothers reported to have been given micronutrient supplement during ANC visits, however, not all mothers had been given the supplements. Among those who were given the supplements (39.5%, n=34), they were found to have higher probability of practicing good nutrition.

5.3 Conclusion

The study makes the following conclusions

1. The age of the pregnant mother should be considered when offering nutritional counseling since young mother are poor observers of good nutritional practices
2. Education level of the pregnant mother determines their understanding of good nutritional practices; higher levels of education were associated with good nutritional practices. Therefore, health workers should endeavor to enlighten

pregnant mothers on nutritional practices especially those with low levels of education or no formal education

3. Employment status of the mothers was significantly associated with nutritional practices. This indirectly showed the capability of the mothers to decide on which food to take as per their income. Therefore, the mothers should be advised on how to practice good nutrition with the available foods and not necessarily the foods to be bought.
4. Culture of the mother also affected their nutritional practices. The mothers believed that babies born with abnormalities are as a result of taking prohibited foods, health care providers should shed light on such misconceptions.

5.4 Recommendations

5.4.1 Recommendation for policy makers

The study makes the following recommendations

1. The national government through the county government of Tana River to implement policies in the universal health coverage agenda that focuses on nutritional counseling for all pregnant mothers.
2. The national government through the county government of Tana River to implement policies in the universal health coverage agenda that focuses on universal access of micronutrient supplements to all mothers

5.4.2 Recommendation for practitioners

1. All health care providers attending to pregnant mothers to ensure all mothers are counseled on good nutritional practices using the available resources
2. When giving nutritional counseling to the pregnant mothers, it should be individualized based on age and level of education

5.5 Recommendations for future research

The researcher recommends a qualitative research to be done on cultural and religious beliefs affecting nutritional practices among pregnant mothers.



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APPENDICES

Appendix I: Letter to Ngao Sub-County Hospital

Benjamin Mwangi Murage
P.O Box 607,
Murang'a

02/01/2020

The Medical Superintendent
Ngao Sub-County Hospital
P.O Box 131, Garsen

Dear Sir/Madam

RE: Permission to Carry out Research in Ngao Sub-County Hospital

My name is Benjamin Mwangi Murage, a Master's of Science in Midwifery student at Mount Kenya University. I hereby write to you to kindly request for your permission to conduct Research on the determinants of nutritional practices among pregnant women attending antenatal clinic at Ngao Sub-County Hospital.

The accomplishment of this task will be fundamental to my fulfillment of the award of Master's degree at Mount Kenya University Thank you in advance.

Yours sincerely, Benjamin
Mwangim Murage
ID:

Appendix II: Consent Form and Declaration

Title of the study: Determinants of Nutritional Practices among Pregnant Women attending ANC at Ngao Sub-County Hospital, Tana River County

Researcher: Benjamin Mwangi Murage

Institution Affiliation: Mount Kenya University

Instructions: Kindly read the contents of this form carefully and complete the form.

Introduction

I would like to invite you to take part in filling out the attached questionnaire in regards to this study. The research is conducted by Benjamin Mwangi Murage, a master's of science in Nursing (Midwifery) at Mount Kenya University. The primary respondents are pregnant women attending antenatal clinic at Ngao sub-county Hospital, Tana River County. The goal is to assess the determinants of nutritional practices among pregnant

women attending the antenatal clinic. The research will provide informative data on the contributing factors to malnutrition in pregnancy. You are invited to be a respondent in this study because you are an expectant mother visiting the antenatal clinic at Ngao Sub-county Hospital. In compliance with the ethical considerations in research, this form outlines to you concrete details of your role as a participant including the benefits or risks that may accrue from your participation. You are expected to read the details and append your signature and date of filling the form.

The aim of the Study

The aim of the study is to assess the determinants of nutritional practices among pregnant women attending antenatal clinic at Ngao Sub-county Hospital, Tana River County. Specifically, key areas on individual factors, socio-cultural factors, and facility-related factors will be assessed.

Study Benefits

The study offers a direct benefit to you as the respondent in that essential nutritional information will be provided by the research assistants. Indirect benefits will include the option of giving your opinions or suggestions on practices that might be employed to improve nutritional practices among pregnant women. The outcome of the study will also be utilized to help improve nutrition services by Ngao Sub-county Hospital.

Risks

Participation in this study poses no risks or bodily harm to you as the respondent.

Compensation

Your involvement in this study is purely voluntary and has no monetary rewards attached to it.

Participation or Withdrawal from the Study

Participation in this study is purely at your will. In addition, the right to withdraw from the study is at your discretion.

Sharing the Results

The outcome of the research will be published in academic journals and results disseminated in scientific and academic platforms.

Confidentiality and privacy

You are not required to put down your name or personal identification details either in the consent form, questionnaire, or in any other section of the documents provided. During the academic presentations and publishing, there will be no information provided likely to identify you.

Consent Declaration

I declare that the study has been satisfactorily explained to me by the investigator. I understand that the study will involve assessing the determinants for nutritional practices among pregnant women attending antenatal clinic at Ngao Sub-county hospital. I also understand that my participation is voluntary and that I preserve the right to withdraw from the study at any time without interfering with my antenatal visits. In addition, i also understand that the information provided in this study will be treated with utmost confidentiality and privacy by not writing down my name.I voluntarily consent to be a respondent in this study and that a copy of the consent form has been issued to me for clarifications should they arise.

Signature of Participant _____ Date: _____

Statement by the Researcher

I declare that I have explained the details of the study to the respondent and that the consent has been obtained without any undue pressure on the respondent.

Researcher's Name: _____

Signature _____ Date _____

For any clarification regarding your participation in this study, please contact

Researcher: Benjamin Mwangi Murage. Mobile No: 0723811685

Supervisor 1: Dr. Jane Karonjo. Mobile No: 0725514358

Supervisor 2: Dr. Nilufa Jivraj. Mobile No: 0704088093



Appendix III: Questionnaire

Instructions:

- i. You are kindly requested to carefully read every part of the questionnaire, understand and give appropriate feedback.
- ii. Your personal identification details such as names, telephone number, or national Identity Card numbers are not required in any part of the questionnaire.
- iii. Indicate your response on the designated areas using either an (X) or a (✓)
- iv. Kindly give all the responses in the spaces provided.

Section 1: Individual Factors

1. What is your age bracket?
 - 15-20 years
 - 21-25 years
 - 26-30 years
 - Over 31 years
2. What is your marital status?
 - Married
 - Single
 - Divorced
 - Widowed
3. What is your highest level of education?
 - No formal education
 - Primary Level
 - Secondary Level
 - College Level
 - University Level
 - Postgraduate Level
4. Are you in any form of employment?
 - Yes
 - No
5. If yes, which type of employment?
 - Self-employment

- Public Service
- Private companies

6. Who makes financial decisions in your family?

- Wife
- Husband
- Husband and Wife
- In-laws
- Others (specify)

7. Have you experienced any health problems that led to food restrictions in any of your pregnancy?

- Yes
- No

8. If yes, which foods were you encouraged to avoid?

9. Do you know what a balanced diet is?

- Yes
- No

10. If yes, how often do you take a balanced diet?

- Regularly
- Sometimes
- Rarely
- Never

Section 2: Socio-Cultural Factors

11. What is your religious Affiliation?

- Christian
- Muslim
- Hindu
- Others (specify).....

12. Does your religion restrict any type of food intake during pregnancy?

Yes

No

13. If yes, Specify

14. Does your culture restrict any type of food intake in pregnancy?

Yes

No

15. If yes, Specify

16. What is the likely consequence of taking the food restricted by culture or religion?

Miscarriage

Disabled baby

Difficult labour

Not known

Others (specify).....

Section 3: Facility-Linked Factors

17. Were you offered nutritional counselling during your present pregnancy at the hospital?

Yes

No

18. If yes, was this done with the aid of nutritional models to enhance your understanding?

Yes

No

19. Were you given any micronutrient supplements at the facility during your visits?

Yes

No

Appendix IV: Introduction Letter from School of Post Graduate Studies

Mount Kenya  University

**OFFICE OF THE DEAN SCHOOL OF NURSING
INTERNAL MEMO**

TO: DIRECTORATE OF POST GRADUATE STUDIES FROM: DEAN- SON

REF: MKU00/NURS/2021/04

DATE: 3RD FEB 2021


SUBJECT: INTRODUCTION LETTER TO NACOSTI FOR MSCN STUDENTS

The purpose of this memo is to request the directorate to allow the following listed students whose files are complete to proceed with their thesis after they were approved by the ERC and cleared by NACOSTI without the introduction letter from the Post graduate directorate. All of these students have since progressed to data collection and defenses at the departmental and school level.

Name

1. LAURENZIA WANJA NJERU- MSCN/55269/2016
2. WILFRED ALOO- MSCN/2017/74493
3. MARY MUMBI NGANGA- MSCN/55400/2016
4. TABITHA KARIMI NTARAGWI- MSCN/2016/57279
5. JANE WANGUI MUNYIRI- MSCN/48208/2016
- + 6. BENJAMIN MWANGI- MSCN/2017/69220
7. ANGELINA WANZA- MSCN/2017/74216

Regards


MOUNT KENYA UNIVERSITY
DEAN SCHOOL OF NURSING
SIGNATURE
Dr Jane Karanja
DATE: 3/2/21
Dean - SON
...jk...

Appendix V: Certificate of Ethical Clearance from MKU



REF: MKU/ERC/1541

Date: 29/01/2020

TO: BENJAMIN MWANGI MURAGE REG: MSCN/2017/69220

Dear Sir/Madam,

RE: DETERMINANTS OF NUTITIONAL PRACTICES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT NGAO SUB-COUNTY HOSPITAL, LAikipia COUNTY

This is to inform you that **Mount Kenya University** has reviewed and approved the above research proposal. Your application approval number is **643** and the approval period is **29/01/2020 – 28/01/2021**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including informed consents, study protocol and MTA will be used
- ii. All changes including amendments, deviations and violations must be reported for review and approval by **Mount Kenya University**
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risk to the safety or welfare of study participants and others or affect the conduct of the research must be reported to **Mount Kenya University** within 72 hours
- v. Clearance for export of biological specimens must be obtained from the relevant institutions
- vi. Submission of a request for renewal of approval at least 60 days before the expiry of the approval period. Attach a comprehensive progress report to support the renewal
- vii. Submission of an executive summary report within 90 days up to the end of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances as required.

Yours sincerely,

The Chairman

Mount Kenya University

Ethics Review Committee

P. O. Box 342 - 0100, Thika


Prof. Francis W. Muregi

Chairman, Mount Kenya University IERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 77 28 11 11






Cell: +254 720 790 796, 0709 153 000

Email: info@mku.ac.ke, Web: www.mku.ac.ke

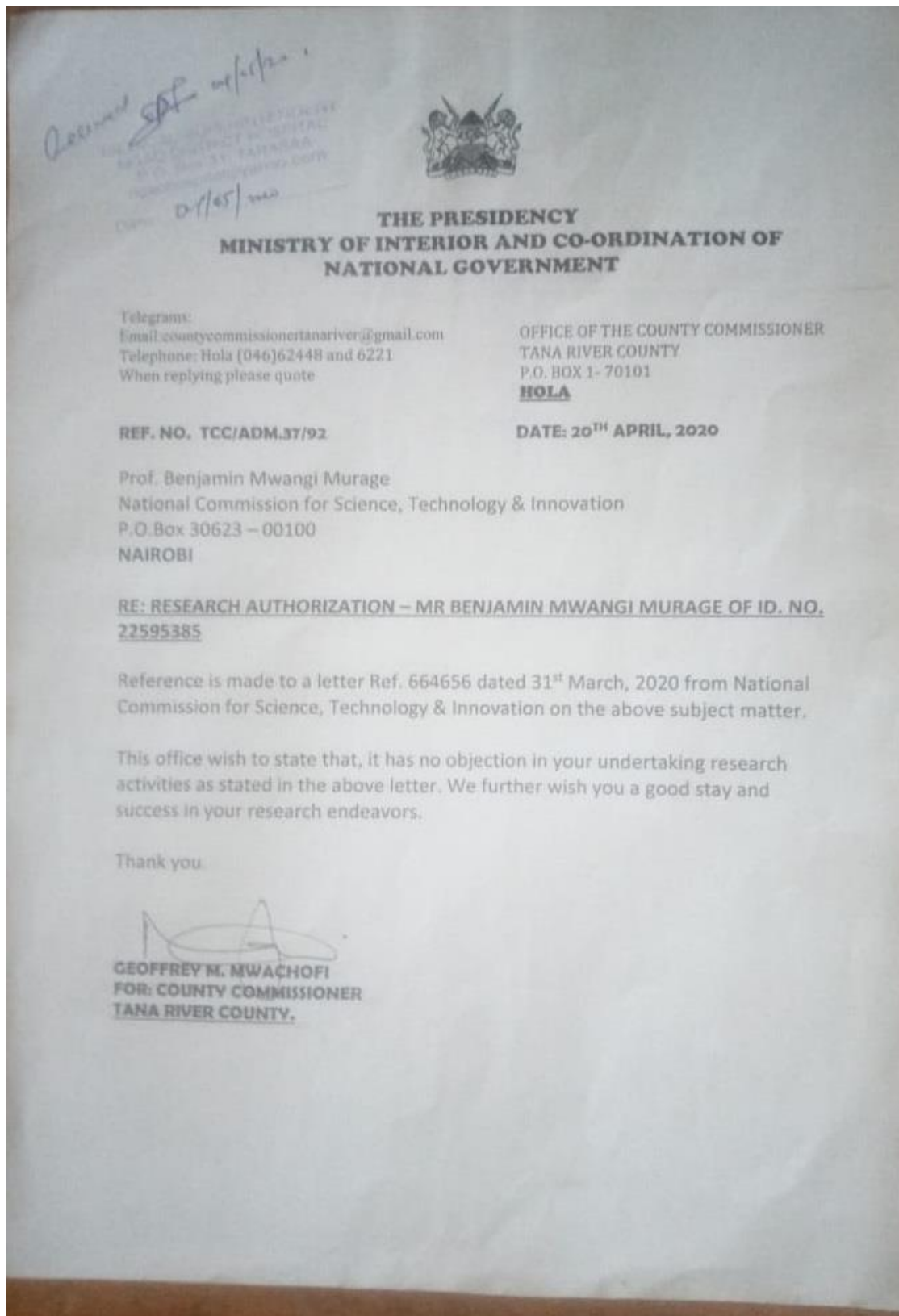
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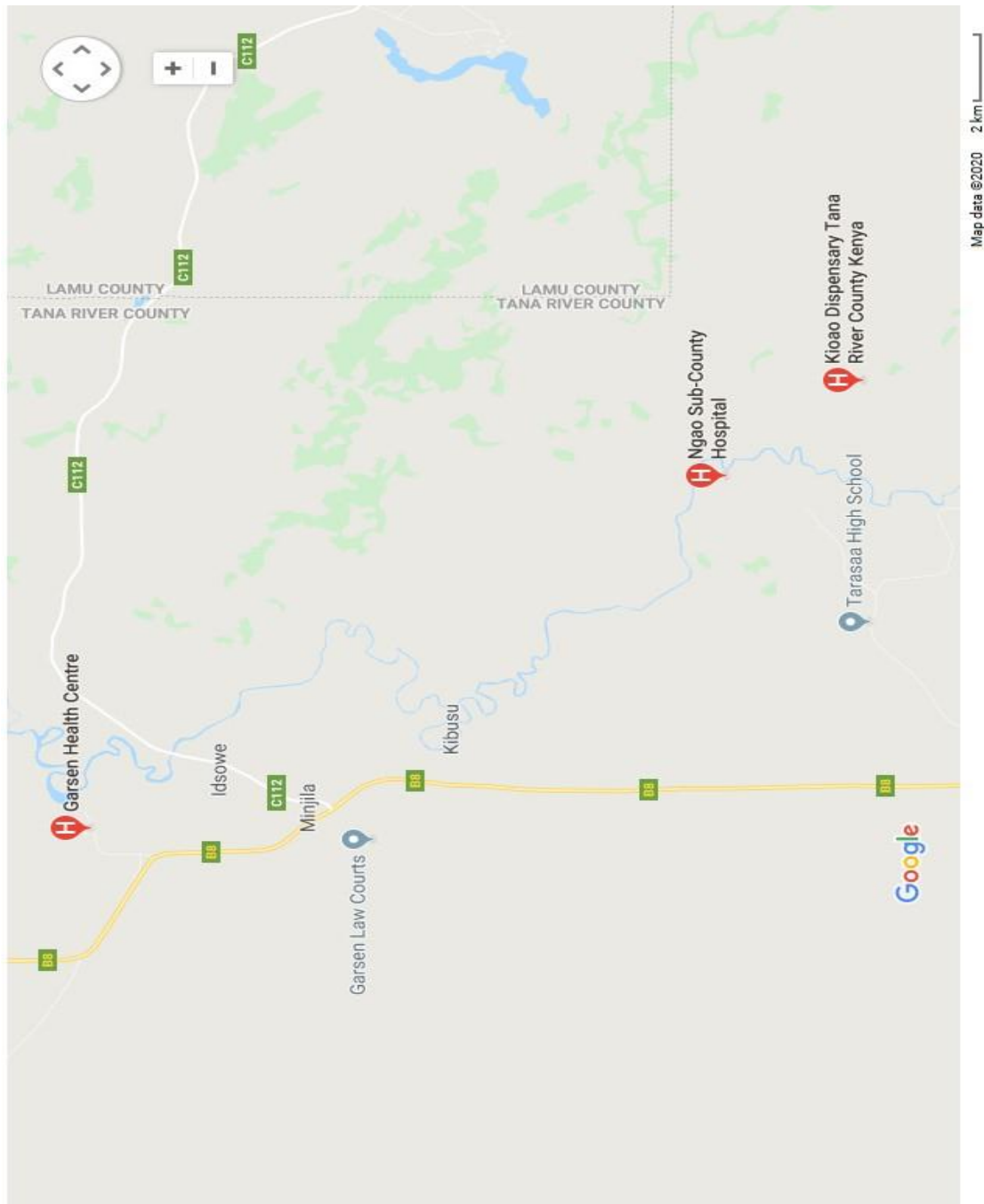
Appendix VI: Research Permit from NACOSTI

 <p>REPUBLIC OF KENYA</p>	 <p>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION</p>
Ref No: 664656	Date of Issue: 31/March/2020
RESEARCH LICENSE	
	
<p>This is to Certify that Mr. Benjamin Mwangi Murage of Mount Kenya University, has been licensed to conduct research in Tana river on the topic: DETERMINANTS OF NUTRITIONAL PRACTICES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT NGAO SUB-COUNTY HOSPITAL, TANA RIVER COUNTY for the period ending : 31/March/2021.</p>	
License No: NACOSTIP/20/4352	
664656 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	

Appendix VII: Authorization Letter from Ministry of Interior and Coordination of National Government



Appendix VIII: Study Area Map



DETERMINANTS OF
NUTRITIONAL PRACTICES
AMONG PREGNANT WOMEN
ATTENDING ANTENATAL CLINIC
AT NGAO SUB-COUNTY
HOSPITAL, TANA RIVER
COUNTY

by Benjamin Mwangi

Submission date: 03-May-2021 06:01AM (UTC-0500)

Submission ID: 1576681922

File name: Benjamin_Thesis.pdf (914.36K)

Word count: 20006

Character count: 115928

DETERMINANTS OF NUTRITIONAL PRACTICES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT NGAO SUB-COUNTY HOSPITAL, TANA RIVER COUNTY

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